

# THE IRON AGE

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## The Foreman Becomes a Manager

By Applying Mass Production to Training, Armco Has  
Achieved Greater Efficiency and Reduced Waste  
Through Its Foreman-Manager Plan



LMOST every day the morning paper blares forth the announcement of a merger of some description—of small businesses combining, or a large institution assimilating a small organization, or the amalgamation of already enormous industries into colossal corporations.

In practically every merger, investigation will reveal that the attempt is made to retain or improve the managerial forces of the member units so the same personal attention may be accorded the business of the merged companies. This retention of managerial identity is, indeed, recognition of the highly necessary individual touch in production.

To one person bigger business has brought increased importance. That is the foreman, individually the head of the smallest operating unit, but collectively the most important figure in industrial productivity. For many years leading industrialists have subjected him to microscopic examination, and have realized his true value. Industrial corpulence has enhanced his worth. He is the answer to the riddle of still bigger business, and it is a

safe prophecy that his mental equipment will receive more attention as time goes on.

View this key man of industry from all sides. He is the only figure in the industrial fabric that truly represents the elements of management and men. To the working force he is the visible management. His words are law. He interprets and applies organization policies, tells what to do, and when and how to do it.

But from the management's point of view, this modern Dr. Jekyll is quite a different person. To them he is the working force; a person to receive orders and to see that they are executed. He is responsible for gang productivity.

### Training Has Been Too Academic

All this has long been recognized, and many different plans for foreman training have been evolved. They have done much to improve the general tone of foreman material, but some of them have certain inherent faults, smacking too much of the schoolhouse, without sufficient

ONE of Armco's Foremanship Classes of a Few Years Back. Under the old plan, foremen met in the class room and discussed weighty, debatable subjects. Contrast this with other photographs showing foreman-managers in action in the mills





**T**HE Crane Operator Can Save or Damage Material in Process. The Foreman-manager plan does not overlook him. Here is a foreman drilling a crane operator who needs greater dexterity in handling the controls

regard for the University of the Mill. The most widely used method is the voluntary or selected group in conference, at which weighty, debatable subjects like psychology, morale, leadership and personality are discussed in the classroom. Often there is much oratory, and it is not unusual to find the loudest talkers in the schoolroom practising the least in the mill.

The enlarged structure of business demands training that will produce benefits at a higher rate of speed. This will probably hasten the revolutionizing of the existing foreman training plans.

For more than 10 years the American Rolling Mill Co., Middletown, Ohio, has plugged away at foreman training, using the conference method in all of its plants. The growth of the organization, coupled with a demand from the foremen that they be given more tangible training which they could actually apply to their jobs, led to the decision to scrap the old plan and plunge off into the unexplored. The new plan went into operation in 1929, and its soundness has now been tested.

Generally speaking, the program is focused on the broadening of the foreman's appreciation of his own responsibilities and improving his job technique. Its foundation is the adoption of three logical premises. The first is that the foreman is a manager. To do his job effectively he must have the managerial viewpoint—must know what is expected of a manager. Second, as a manager his efforts should be directed at lowering the costs of production. Third, the most important factor contributing to decreased costs is the prevention of waste.

#### Waste Prevention Is Major Topic

Waste prevention is a big, broad subject. Armco's personal service staff analyzed the foreman's job from this angle and were astonished at the regularity with which each of his functions points directly at waste prevention. It encompasses his job. They concluded, too, that because waste occurs every day right under the foreman's nose, its measure being limited by his managerial ability, the prevention of waste would serve as an excellent vehicle to

convey the program into the foreman's realm. Another advantage is that the results can be definitely measured by the cost sheet.

You may ask, "Why the name 'foreman-manager'?" The Armco personal service staff reasoned that there are general managers, works managers, and department managers, so why not "foreman-managers." Functionally, all of these jobs have a shadow-like similarity, decreasing successively in degree and scope. The general manager, among other things, is charged primarily with the responsibility of producing the greatest quantity of finished material of a quality demanded by the customers at the lowest possible cost. Even though the foreman-manager may be concerned with but a single operation, within his field he has the same responsibility. The general manager may be responsible for 10,000 persons, and the foreman-manager for 10, but both handle men. There are many more coinciding functions, but this is enough to show that the term "foreman-manager" is logical.

However, Armco's foreman-manager training should not be confused with a waste prevention program. That is simply the emery wheel which whets the foreman-managerial faculties—a familiar tool with which he and his men can work best, and simultaneously improve their job knowledge.

#### Waste Prevention Program Is Classified

A well-organized waste prevention program was selected, which classifies waste under six major headings:

1. The waste of labor.
2. The waste of machinery and equipment.
3. The waste of materials and supplies.
4. The waste due to accidents and illness.
5. The waste of steam, gas, oil, air, water, etc.
6. The waste of space.

This, of course, is an arbitrary grouping and can easily be changed without damage to the plan. An analysis of each of these subjects shows how completely they cover the field. Take the waste of labor as an example. It was attributed to three major causes—direct and contributory—idleness, poor workmanship and labor turnover, which were in turn broken down into contributory causes.

The operation of the course hinges upon the company's policy that the department superintendent is responsible for the training of his men, and succeeds or fails according to his ability to disseminate usable information to the working forces under his control.

#### Emphasis Put on Actual Practice

The conference method was not entirely abandoned, but is used as a means rather than the whole. Emphasis is laid upon the actual practice on the job of the points emphasized in the discussion. One month is devoted to each of the subjects listed above and every precaution is taken to quiet the effervescent dangers of a campaign. Earnest sincerity in the pursuit of job knowledge is the goal.

Each subject is first presented by a standard plan. The works manager of each Armco plant assembles his entire supervisory force, usually at a dinner meeting, the first of each month. There the blanket outline of the month's program is described. Every subject is divided by four, a different topic for each week. The last week of each month is always devoted to the study of the cost sheets as affected by that particular subject. At these general meetings no attempt is made to analyze or discuss job technique.

Then is begun the next step in the operation of the plan, when the general superintendent of each plant calls in his department superintendents. These men break down the outline into departmental problems and discuss corrective measures. Such meetings are always supplemented by a review of the previous week's accomplishments. Here is a typical outline devoted to the first week's study of the waste of machinery and equipment:

#### WASTE OF MACHINERY AND EQUIPMENT

First Meeting. Week of Jan. 6, 1930

##### *The Waste of Machinery and Equipment Through Improper Operation*

The productiveness of any machine is measured by its ability to lend itself to constant and speedy operation plus trained, skillful operators.

The effectiveness of a machine may be unsatisfactory because of poor design, improper maintenance, or misuse and abuse. More often, the effectiveness is reduced by inadequate planning and scheduling.

##### 1. Failure to attain capacity rate of operation.

- (a) Every machine or piece of equipment should have capacity rating established;
- (b) Capacity rating should be bogy for that machine;
- (c) Operator should be informed of capacity standard;
- (d) Movement of material to and from machine should be scheduled to avoid idleness with attendant peak loads;
- (e) Plans and devices should be effected whereby unexpected delay in the movement of material to and from a machine may be reduced to a minimum so as to prevent enforced idleness of equipment.

##### 2. Allowing machines to run non-productive or idle without shutting down.

- (a) Machines running idle add unnecessary power, lubrication, fuel, maintenance, and depletion costs;
- (b) Each machine should have starting-up cost established and operator so informed;
- (c) Each machine should have idle-running cost established and operator so informed;
- (d) Each machine should have time limit established whereby it may run idle profitably and beyond which it should be shut down. Operator should be so informed and charged with responsibility of shut-down when so indicated.

##### 3. The operator's responsibility for proper care of his machine. He should be responsible for:

- (a) Frequent and complete inspection of machine and its complementary equipment;
- (b) Proper adjustment so as to turn out quality production and avoid accidental damage to machine or operators;
- (c) Proper lubrication which involves sufficient oiling and greasing at points needed and eliminates wasteful use of material which adds to slipping hazards, fire hazards, and obscures rigid inspection;
- (d) Cleanliness of machine and

adjacent territory. This is necessary for thorough inspection, safe and efficient operation, and proper pride in machine and surroundings;

- (e) Prompt reporting of defects or conditions needing correction;
- (f) Seeing that none but authorized persons operate machine, thus preventing injury to persons and damage to equipment;
- (g) The proper application of safety principles and precepts established for his machine.

This week's work offers an opportunity to review the situation of each machine and piece of equipment within all departments in the light of the above outline. It should be utilized for a general clean-up and inspection of every piece of equipment with the idea of listing all needed repairs for next week's work.

The greatest opportunity for economy lies in the training of operators in their responsibilities and in planning and scheduling the movement of material to prevent unproductive delay of machines.

#### Departments Hold Weekly Meetings

Next the department superintendent goes into action with a meeting of his foremen-managers and leaders. There the weekly program is localized to fit departmental functions and the actual application of the principles of conservation is begun. Here, too, are given weekly reviews of the past week's accomplishments, and the conclusive cost sheet is often produced to ascertain whether those accomplishments are real or imaginary.

The final step, and the one which receives the most emphasis, is the foreman-manager's application of the information he has received to the job. In other words, he studies tonight, for many of the meetings are held in the evenings in mill offices, and applies tomorrow. But if he fails to apply his information, then it is a matter for the superintendent to settle.

After several months of operation some very interesting and significant by-products have been observed. While the program was designed primarily for foreman-manager training, it embraces all of the supervisory group in its ramifications. Many splendid department superintendents



**F**OREMEN Have Always Fought "Bent Corners" from the Hot Mills to the Shipping Department. The foreman-manager on the right is explaining the causes and costs of damaged corners to one of his men

are deficient in training on some particular point, of which failure to understand and read cost sheets intelligently is a good example. With the dignity of an operating executive to uphold, it is possible that some of them have the view that any open unbending to dig out rather elementary facts might be the cause of decreased respect from their organization. This program painlessly forces the acquisition of such information, because it would be still more embarrassing for the group to discover their personal deficiency. That reaction, of course, is common only to the proud, but practically every Armco superintendent will admit that he has learned a great deal about the elements that make up costs. It is not a debatable statement to say that control through the cost sheet is highly desirable and necessary.

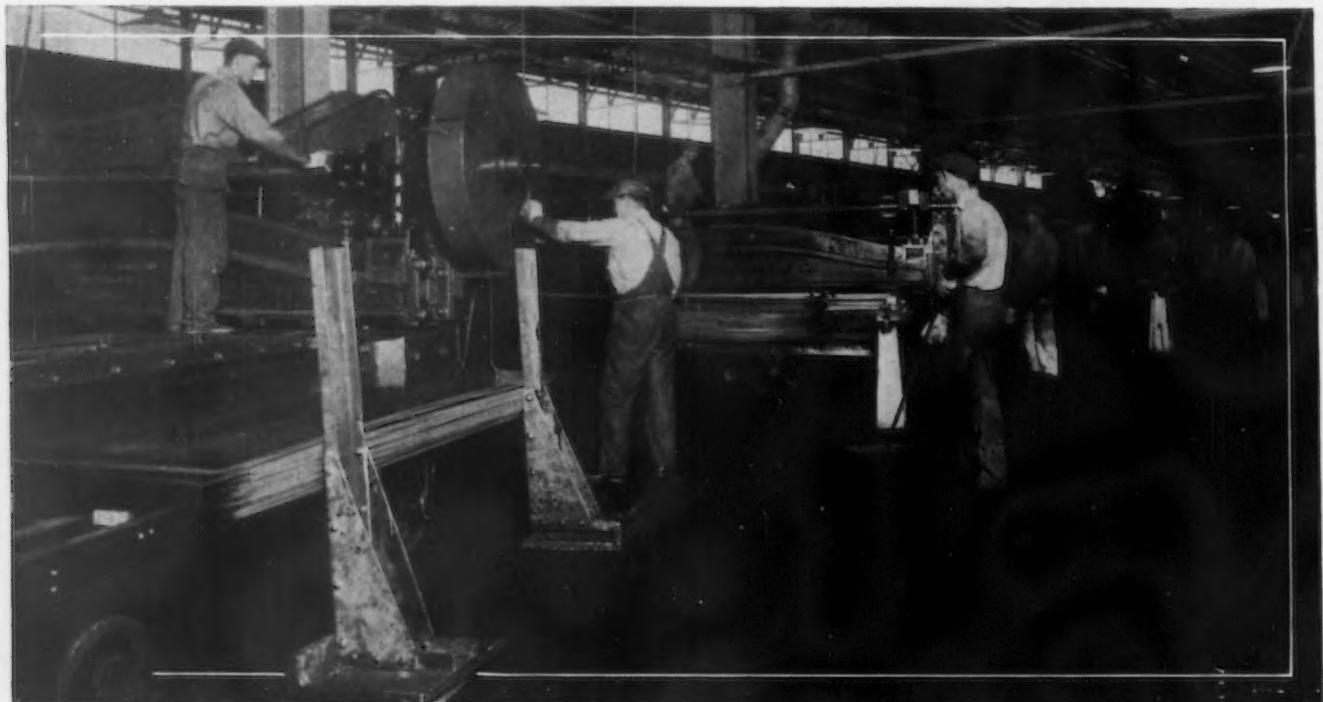
#### Service Departments More Widely Used

Another significant development is the trend toward

Then said he: "Bill, you investigate the waste caused by spilled sheets; Henry, this is your subject; Jim, you take bad piling." Every foreman-manager was assigned a subject, told to investigate thoroughly all of the causes contributing to that particular kind of waste and to recommend in writing how the troubles could be cured. These papers are assembled now in one volume. It is a departmental encyclopedia of information, and best of all, each of the foreman-managers learned a lot more about his own job than he ever knew before. Their viewpoint is entirely different, to say nothing of their increased interest.

#### Manual of Production Prepared

Paralleling this was the request of a works manager that the department superintendents each prepare papers on the different factors affecting yield in their respective department, from the ore pile to the finished product. Normally, busy people do not write papers unless they feel the



**C**REWS of These Thirteen Armco Shears Worked Out an Arrangement Whereby the Incoming Shift Takes the Discarded Gloves from the Men Going Home and Carefully Wipes Down and Inspects the Equipment. Every drop of oil comes off and the shears literally shine

greater use of the company's service departments, such as cost, betterment, engineering and personal service. This is attributable to a better understanding of their functions.

During the month devoted to preventing the waste of materials and supplies, some very interesting developments came to the surface. For instance, in one plant it was found that a ridiculously large quantity of lubricants and canvas gloves had supposedly been used during the year; in another plant stationery and forms costs \$44,000. Although the relative importance of these items in the reduction of a steel plant's costs is rather insignificant, yet these illustrations provided dramatic evidence of waste and resulted in the voluntary agreement to budget supplies. This will eventually bring the saving of many thousands of dollars, for supplies can be budgeted as well as other items of expense.

Here is another example of how the plan works. A processing department superintendent called his men together and asked them to enumerate the different sources of waste of material in process. They were written down.

urge of necessity. At any rate, these papers have been prepared and will serve as a manual of production that is priceless to the American Rolling Mill Co.

The ready acceptance by the working organization is another salient proof that the program is what the men want. Foremen-managers in every department have enthusiastically expressed their appreciation of this form of training as another tool which they can use to get results on their jobs. It has brought understanding of purpose, definition of job effort and greatly increased departmental coordination.

The use of the cost sheet as a check on progress marks this program as distinctly practical. Many foremen-managers did not know that the cost of maintenance repairs was charged off into their operations. Since that information has been generally understood, they are vastly more interested in seeing that their men protect the equipment. The foreman-manager knows what fuel, power, light, air and all such items cost his department, and consequently exerts more pressure to stop any leakage.

Probably the climax of the results which might be attributable to foreman-manager training is the recent orgy of record breaking in which all plants are participating. After a business depression, it usually requires a certain amount of time for an organization to shift into high gear. However, with the return of a greater volume of orders to the mills in January, the Armco organization began to smash production records immediately. The last edition of the plant newspaper tells of the establishment of 28 new production records.

Having had a good look at the organizational X-ray revealed by the foreman-manager training plan, the American Rolling Mill Co. is now seriously considering the establishment of a standard minimum requirement which men must be able to meet before they can be promoted to supervisory jobs. As is the case in most industries, promotion to the rank of foreman was simply the execution of some one's opinion. If the opinion was wrong and the man not quite "ripe" to assume responsibility, he assimilated the necessary amount of training through the routine of the job and at the expense of production. The minimum requirements which are now being contemplated would

sort out those requiring more training as well as those who should never accept supervisory responsibility.

As this adaptation of waste prevention as a vehicle for training is so new, there are many points still to be ironed out. It is so broad, wandering into every nook and cranny of the organization, that it does not easily boil down for descriptive purposes.

During the first month an interesting reaction was observed. The organization had been accustomed to the school book type of training, and were expecting something of that sort. Consequently, it required a few weeks for the true objectives to become recognized and the haze dispelled.

There are almost 1000 men in the Armco supervisory group, located in plants in four different States. All of them are engaged in this search for usable information to improve their jobs, for Armco considers training as a business proposition—anything that strengthens the company's position in the industry adds permanence and value to the individual's job. It is indeed the application of mass production to training.

## Problems Ahead in Management Engineering

**T**WO speakers addressed the American Society of Mechanical Engineers at the Management Congress and Materials Handling banquet in the Stevens Hotel, Chicago, on March 5. These were Dexter S. Kimball, dean of engineering, Cornell University, and past-president of the society, and Craig B. Hazlewood, vice-president, First National Bank, Chicago. Mr. Hazlewood outlined the banker's viewpoint on the subject of industrial management.

Tracing the history of human progress as a series of surges, each of which brought to a high degree of development some phase of activity, Dean Kimball stated that in the half century ending with 1900 humanity made more progress in the practical arts and mechanics than had been achieved in all of history before that.

Now that the Atlantic has been crossed by steamer in four days, the continent by train and airplane in two days, and communication by telegraph and telephone have become almost instantaneous, the gains yet to be made along many engineering lines are becoming smaller and smaller. The law of diminishing returns is getting in its work and engineers are turning to other phases of activity for further progress.

### How the Engineer Got Into Management

In particular, managerial matters are naturally engaging their attention. This subject is so new, when viewed in the light of history as a whole, that many of us can remember when there was no knowledge worth the name on real cost-keeping methods. During the past few years, however, we have reached the point where we know fairly well what management is and what it can do. Already we have begun to evaluate its mechanism and to put it on a definite basis.

Heretofore our contact with management has been largely empirical. During the next quarter century we shall put it on a more soundly scientific basis. One of the subjects which have come up very recently, and which will tie in closely in management in the near future, is the question of the most economical quantity of goods to produce in a given lot. This is beyond the scope of the foreman and beyond that of most superintendents. It involves mathematics and particularly the calculus, and as

such is considered highly technical.

In 1850 the average wealth of the American people figured out at about \$353 each. It is now above \$4,000, and in the real sense there has never been a year when it has not advanced. The national wealth of 400 billion dollars and an annual income of 90 billions has put us at a point never before approached by any nation on earth. Much of this has been due to the work of the engineer and his connection with industry.

We are the first people of any great size to decide that everybody shall be educated. This coincides with our economic progress and results from the fact that that progress has provided us with an excess of this world's goods.

### Management's Far-Reaching Ramifications

Conquest of disease is the most important, most far-reaching and most hopeful element of progress which we have ever had. Many diseases will never become extinct; we shall not conquer them all completely. Occupational diseases, however, are coming rapidly under control, and this is a function of management.

Poverty cannot be abolished completely. But we can abolish compulsory poverty. There is something here still for management to solve. There must be some way of smoothing out the hills and hollows of our cycle of business history and in that way avoid throwing men out of work.

### Early Appraisal of Labor Displacement

Mechanization as an element in displacing man-power was a factor well recognized at the beginning of the century. In the census report for 1900 an analysis was made as to what was happening along this line, and the editor of that report had the temerity to prognosticate what was going to happen. The matter did not work out so badly as he thought it might, but it had been bad enough and has become one of our big problems.

Thus the problems ahead of management are great. They will form a great challenge to our economic progress and our economic sense. That they will be solved, however, is practically certain and there seems to be on the horizon nothing to worry about.

# Rational Choice of Tool Steels

Fourteen Types Embrace 98 Per Cent of Tonnage  
Used—Problem of Selecting Proper  
Steel Not Easy

BY JAMES P. GILL\*

OCCASIONALLY quite an unusual order will come to our company specifying a certain steel for a specific purpose. One I can never forget—it read something like this—"Please send me 3 ft. of 1½-in. round Red Cut Superior high-speed steel, which I understand is the most expensive steel I can buy. I hope that, after I make an axle for my auto from this steel, I will have no more trouble from breakage."

Certainly an exaggerated case of irrational selection, yet in the plant of almost every large manufacturer can be found operations where the efficiency could be considerably improved by the proper selection of tool steel. This should not be at all surprising when we consider that every manufactured article, you cannot name an exception, somewhere in the process of manufacture must depend on tools of tool steel, a statement well worth thinking about. Again, there are some 600 to 700 brands of tool steel on the market, some 200 to 300 of which are of fairly wide usage, and to many a manufacturer the selection of the proper grade from such an array is bound to be baffling, yet, if we study carefully the composition of these many brands, we will find probably over 80 per cent of the steels of wide usage will group themselves into something less than 20 general types.

Before considering these general types let us review briefly the effect of the many alloys, or rather elements, at the command of the tool steel manufacturer.

#### Three Groups of Alloying Elements

Alloying elements used in steels may be roughly divided into three groups, based on whether or not the element is

\*From a paper delivered before the New York, and also the New Jersey, chapters of the American Society for Steel Treating. The author is chief metallurgist, Vanadium Alloys Steel Co., Latrobe, Pa.

completely dissolved by the iron, combines with the carbon to form a carbide, or is partly dissolved by the iron and partly forms a carbide. Such a classification can at best be based only on the general affinity of the alloying element for carbon, since both the amount of the carbon and the alloying element present determine to a considerable degree whether the alloying element will be dissolved by the iron, combine with the carbon, or both.

Elements which are dissolved by the iron generally increase the strength and toughness of the steel and those which combine with the carbon to form carbides increase the hardness. Therefore, elements which are partially dissolved by the iron and also form carbides have the general tendency to increase both the toughness and the hardness. The major portion of alloying elements come within the third group, that is, are partially dissolved by the iron and partially combine with the carbon to form a carbide.

Fig. 1 is of a photomicrograph of a 1 per cent carbon tool steel, the carbides being in the so-called spheroidized condition. It is shown for the purpose of illustrating what is meant by carbides in any type of steel. The iron in these carbides may be replaced by other elements such as chromium, tungsten, etc. Fig. 2 shows chromium carbides in a high-carbon high-chromium steel and is illustrative of the action of that class of alloys which are essentially carbide-forming. Fig. 3 shows a nickel steel containing 25 per cent nickel and in all appearances has exactly the same structure as if it were a piece of pure iron or another pure metal. There is no material out of solution. This is a general action of nickel and is representative of that class of alloys which combine with the iron to form a solid solution. Fig. 4 shows three pieces of steel which have been hardened and fractured. The pieces are approximately 1 in. round. One piece represents a 1 per cent carbon tool

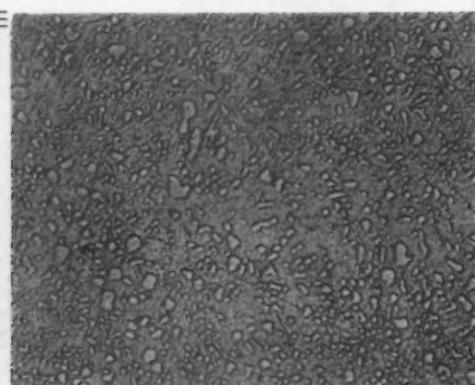
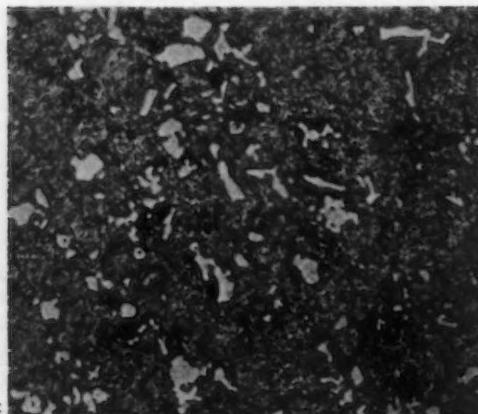


FIG. 1—Photomicrograph of a 1 Per Cent Carbon Steel (x500), the Carbides Being in the So-Called Spheroidized Condition

FIG. 2—Photomicrograph (x500) Reveals Chromium Carbides in a High-Carbon, High-Chromium Steel



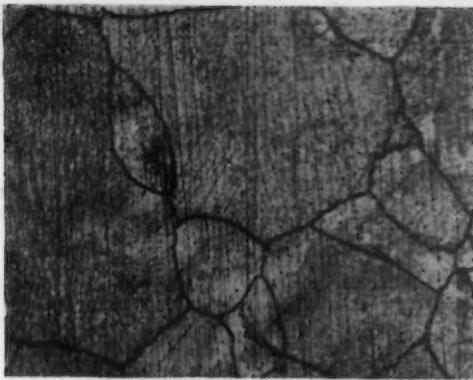
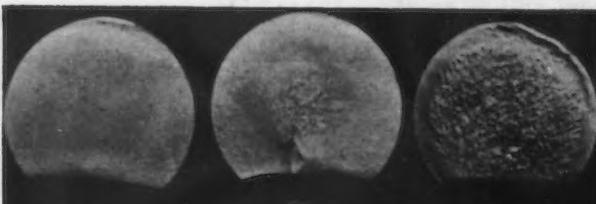


FIG. 3—Photomicrograph (x500) of a Nickel Steel Containing 25 Per Cent Nickel. Note resemblance to pure iron (at left)

FIG. 4—Macrograph, Actual Size, of Three Pieces of Steel Hardened and Fractured (Below)



steel without alloys and shows a very fine grained definite case around the outside with a tough core. The middle fracture is also a 1 per cent carbon steel but containing 0.90 per cent chromium, and, even though hardened from the same temperature, the chromium has caused a greatly increased depth of hardness so that the case extends almost to the center of the piece. The other piece is a 1 per cent carbon steel containing approximately 3.50 per cent chromium and it will be noted that it is hardened entirely through the section.

By varying the quantity and proportion of alloys, the number of steels which can be produced having different physical properties is unlimited. It is somewhat surprising that the most widely used types of tool steels fall into as few groups as they do. Let us consider these general types first and later, if we wish, consider the variables in these types that may particularly adapt them for a specific use.

#### Fourteen Types of Tool Steels Embrace Those Most Used

In Table I we have listed 14 steels in type compositions; that is, in this table are shown the approximate percentages of alloys that distinguish any one of these steels and place it in a class or field by itself. Practically every tool steel manufacturer will make one or more steels that would fall in each of the 14 groups shown and, although the composition between different steels of the same group as made by different manufacturers may vary considerably and would impart to them widely varying physical properties, yet essentially these steels would be of the one type. Undoubtedly 98 per cent of all tool steels used in this country today so far as tonnages are concerned would fall within one of the types.

In Table II we roughly compare the physical properties of these 14 types of steel by dividing these physical properties into three groups only, that is, high, intermediate and low.

If we understand the properties of these general classes of tool steels and knowing the properties required in steel for various types of tools, we should be able to properly classify the general type of steel necessary for the major portion of our tools. Then after once having selected the proper type of steel we can consider what effect the variation in composition and heat treatment may have on this steel to more particularly adapt it for the tool in question.

Every manufactured article somewhere in process of manufacture is dependent upon steel tools. Therefore, there is an unlimited number of specially designed tools, yet the major portion of tools will fall within comparatively few classes. There are three very large classes of tools, namely, cutting tools, shearing tools and forming tools.

Cutting tools might be further divided into three types. First, tools possessing a single cutting edge and used for practically continuous cutting such as lathe or planer tool. Second, tools possessing two or more cutting edges and used for practically continuous cutting such as a drill, tap, chaser, broach, etc. Third, tools possessing a number of cutting edges, each edge taking short cuts and functioning only a small part of the time, such as milling cutters, hobs, etc. It may be interesting to call your attention to the actual manner in which many cutting tools remove the chip.

In Fig. 5 is shown something of the general action of a cutting tool. A lathe tool is shown cutting a chip from a large bar, and it will be noted that in the type of steel being cut the chip breaks ahead of the tool for a considerable distance whereby the actual wear is not so much on the point of the tool as a slight distance in back of the point. Steels which are said to be free cutting throw their chip or cut in this manner.

In Fig. 6 is shown the action of a lathe tool cutting a steel which is exceptionally tough and so tenacious that the chip does not break ahead of the tool, thereby causing rapid wear and excessive heat at the point of contact of the tool. This is the manner in which chips will break from stainless irons and steels and it is this which causes most machinists to state that a steel machines with difficulty.

A steel to be used for cutting tools must, therefore, have the ability to withstand wear and the heat generated at the cutting edge. Toughness, though of considerable importance in a cutting tool, is of much less importance than the two properties named. Therefore, for cutting tools we find that high-speed steel is largely used. If high-speed steel is not used, then there is usually some factor involved, such as cost, smoothness of the finish of the cut, etc. If there is no unusual factor involved, undoubtedly high-speed steel is going to prove the most economical in the end.

There are certain types of cutting tools, such as taps and dies, that are widely used by pipe fitters and others that are hand tools and are, therefore, both somewhat abused and little used. In such tools carbon steel in the neighborhood of 1.10 to 1.20 per cent carbon is quite generally employed. Where the finished cut must be unusually smooth sometimes a high-carbon steel or a finishing steel containing from 3 to 5 per cent tungsten is used. Again, in the cutting of materials other than steel we may find some of the special steels better adapted to the operation, all of which represent an unusual condition. Knowing, therefore, the necessary property for steel to possess for this class of tools makes it evident that high-speed steel is going to be largely used.

Then it may become necessary to consider something

**Table I.—Approximate Composition of 14 Types of Tool Steels**

Type	C.	Si.	Mn.	W.	Cr.	Va.
Carbon tool steel.....	Variable	.....	.....	.....	.....	.....
Carbon-vanadium.....	Variable	.....	.....	.....	.....	0.15 to 0.30 without or
Low Cr or Cr-V.....	0.50 to 1.00	.....	.....	.....	0.30 to 0.90	with 0.15 to 0.30
High C-Low W.....	1.00 to 1.30	.....	.....	1.00 to 2.00	0.50 to 1.50	0.15 to 0.30
Mn. oil-hardening No. 1.....	0.80 to 1.00	.....	1.50 to 1.75	.....	.....	.....
Mn. oil-hardening No. 2.....	0.80 to 1.00	.....	1.00 to 1.30	0.40 to 0.60	0.40 to 0.60	.....
Low C-Low W.....	0.45 to 0.60	.....	.....	1.25 to 2.00	1.00 to 1.50	0.15 to 0.30
Finishing.....	1.10 to 1.40	.....	.....	3.00 to 5.00	1.00 to 2.00	.....
Cr hot work.....	0.80 to 1.00	.....	.....	.....	3.00 to 4.00	.....
Tungsten hot work.....	0.25 to 0.40	.....	.....	8.00 to 10.00	.....	.....
High C-High Cr.....	1.60 to 2.25	.....	.....	.....	10.00 to 15.00	.....
Silico-manganese.....	0.50 to 0.65	1.50 to 2.50	0.75 to 1.00	.....	.....	.....
High-speed steel.....	0.65 to 0.75	.....	.....	18.00	4.00	1.00
C high-speed steel.....	0.65 to 0.75	.....	.....	18.00	4.00	1.00

of the type of high-speed steel or its carbon content. We know that brittleness in high-speed steel is somewhat proportional to the carbon content. We also know that, within certain limits, the higher carbon, high-speed steel will outwear the lower carbon high-speed steel. Therefore, for tools which have a well backed up cutting edge, such as a lathe or planer tool, it is best to use a high-speed steel having a high carbon content, that is, in the neighborhood of 0.75 per cent, or to use a steel of the special type, such as the cobalt high-speed steel. For the major portion of drills, taps, chasers, milling cutters, hobs, broaches, etc., the regular composition high-speed steel containing in the neighborhood of 0.70 per cent carbon, 18 per cent tungsten, 4 per cent chromium and 1 per cent vanadium represents the best balance between toughness and cutting efficiency and is, therefore, best adapted for such tools.

There are instances, however, where toughness must be gained at a sacrifice of cutting efficiency in special types of taps and chasers, particularly chasers that are used in pipe cutting. For tools of this class it is then necessary to use a high-speed steel containing a lower carbon content than normal.

#### Problem of Shearing and Forming Tools Not Easy

With cutting tools the selection of the proper steel is comparatively simple, since in the major portion of cases the steel used must be sufficiently high in carbon to harden with a near file hard edge, but in approaching the other two large classes of tools, that is, shearing tools and forming tools, the selection is not so simple.

Shearing tools would include that very large class of tools which cut material either hot or cold with a shearing action. Thus in the beginning we can separate two large general classes of shearing tools, those which are used for

shearing metal cold and those which are used for shearing metal hot. Shearing tools would include all types of shears, punches, blanking dies, etc. Simple, plain shears will generally fail from wear or abrasion. Therefore, if the shear is well backed up and the material to be cut is not too large, high-carbon high-chromium steels will probably give the very best results, and such a steel is now being very widely used for shears for the cutting of tinplate, spring steel, unannealed bars, etc.

If, however, the shear is not of a rigid type and there is considerable play in the blades, toughness may be of greater importance than wearing ability because of danger of breakage, in which case the chrome-vanadium tool steels are quite widely used. Again, the shear may be used for cutting material hot and the shear itself may become heated in use, then high-speed steel may give excellent results; or, if toughness is also a factor, tungsten hot-work die steels may be used.

Punches are made of almost every type of steel conceivable, from straight carbon steel to the highly alloyed steels, such as high-carbon and high-chromium. Punches will usually fail from wear, although failure from breakage must not be overlooked. The size of the punch, the thickness of the material being cut and whether or not it is hot or cold are all vital factors in the proper selection of the steel. By far the major portion of all punches made by punch manufacturers are still made of carbon tool steel, as it has been found that carbon tool steel, hardening with a hard case and a soft tough core, combines to an excellent degree fair wearing properties and resistance to breakage.

As soon as the steel used for the punch becomes heavily alloyed the punch will harden through its section and is fairly brittle. However, for many punching operations the

**Table II.—Properties of the 14 Types in Table I.**

Type of Steel	Toughness	Usual		Quenching Medium	Comparative Physical Properties		Depth of Case
		Working Hardness	Wearing Ability		Movement	Temp. of Failure	
Carbon .....	Dep. on C.	Dep. on C.	Low	Water	High	Low	Shallow
Carbon-V.....	Dep. on C.	Dep. on C.	Low	Water	High	Low	Shallow
Low Cr. or Cr-V.....	Dep. on C.	Dep. on C.	Low	Water	High	Low	Interm.
High C-Low W.....	Interm.	High	Interm.	Oil	Low	Low	Interm.
Mn. Oil-Hardening No. 1.....	Interm.	High	Low	Oil	Low	Low	Interm.
Mn. Oil-Hardening No. 2.....	Interm.	High	Low	Oil	Low	Low	Interm.
Low C-Low W .....	High	Low	Interm.	Oil-water	Low	Interm.	Interm.
Finishing .....	Low	High	Interm.	Water	Interm.	Interm.	Deep
Cr. hot work.....	Interm.	Interm.	Interm.	Air-oil	Low	Interm.	Deep
W hot work.....	Interm.	Interm.	Interm.	Air-oil	Low	High	Deep
High C-High Cr.....	Low	High	High	Air-oil	Low	High	Deep
Silico-Mn.....	High	Low	Interm.	Water	High	Low	Interm.
High-speed steel.....	Low	High	High	Air-oil	Low	High	Deep
Co. high-speed steel.....	Low	High	High	Air-oil	Low	High	Deep

punch is so rigidly held and so accurately set that danger from breakage is very small, in which case high-speed steel and high-carbon high-chromium steels are quite widely used. Where the material being punched is hot, tungsten hot work die steel is very generally used.

#### Blanking Dies a Difficult Problem

The problem of the selection of the proper type of steel becomes more complicated when we reach that class of shearing tools known as blanking dies, due to the fact that the design of the die, the amount of movement permissible in hardening, the number of times it may be ground without going under or over size, etc., complicates the condition. Many types of blanking dies have thin sections adjacent to heavy sections, a condition making heat treatment difficult. Therefore, in the very beginning it is often necessary to choose an oil-hardening steel to overcome

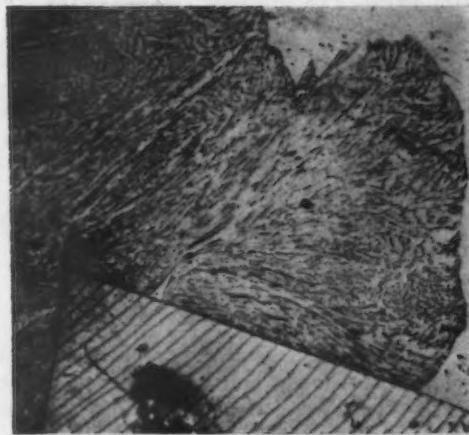
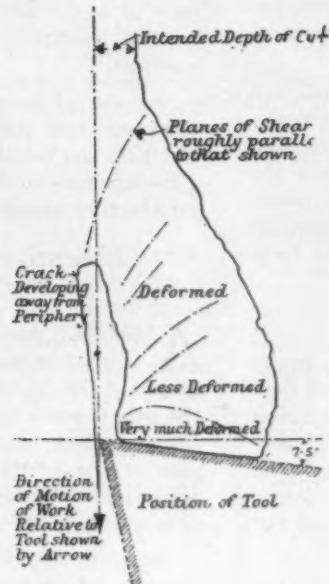
ing of the material cold has increased in popularity, due to the closer tolerance and better finish that can be obtained on the finished part. Because of the many types of forming dies, it is somewhat more difficult to choose the proper type of steel than it is for cutting tools or shearing tools. Because of the shock involved in many types of forming dies, toughness is a greater requisite than the ability to withstand heat or wear, and thus we find chrome-vanadium, chrome-nickel and chrome-nickel-molybdenum forging die blocks generally used.

#### Steel for Other Types of Dies

Certain types of hot-pressing dies where the metal is forced hot under pressure into the impression demands a steel that will not sink or slough off from the high heat. For such dies tungsten hot-work steel is very generally used. Other types of hot pressing dies are water cooled



**FIG. 5—An Attempt to Show Something of the General Action of a Cutting Tool (from Engineering, London)**



**FIG. 6—Action of a Lathe Tool Cutting a Steel Which Is Exceptionally Tough**

possible danger in breakage during hardening. Likewise, the permissible movement that may take place in the die may make an oil-hardening, non-deforming steel a necessity.

However, we have a number of steels which will satisfactorily harden in oil, such as the manganese non-deforming type, the 1.25 per cent carbon, 2 per cent tungsten type, the high-carbon high-chromium type and high-speed steel. Any of these steels will harden satisfactorily in oil and at the same time danger of warpage in all of the types is quite small. If the die has thin walls, it may be necessary to sacrifice wearing qualities for toughness, in which case the manganese oil-hardening or 2 per cent tungsten oil-hardening type may represent the type selection. Many blanking dies are very expensive to cut and are of a nature where failure is almost wholly from wear, in which case high-speed steel, pack hardened, or high-carbon high-chromium steel are the best types to use. Blanking dies used for hot work may be made from either high-speed steel or tungsten hot-work die steel.

Forming tools we usually class as that large group of tools which have an impression which is transferred to the work. Such tools may operate either on hot or cold metal and may impart their impression with a shock, such as a forging die or a heading die, or the metal may be forced into the impression under hydraulic pressure. In most cases the material to be formed is heated in order that it will flow more readily, but during recent years the form-

while in operation, and for such dies both chrome and tungsten hot-work steels are used.

Hot heading dies which are used for forming the heads on bolts demand a steel that will withstand the heat and at the same time be sufficiently tough to prevent breakage. For such dies chrome hot-work die steel and the low-carbon low-tungsten steel is used.

Deep drawing dies used for the shaping of sheet stock must have excellent wearing properties and at the same time be sufficiently tough to withstand the very heavy pressure used for drawing. For such dies carbon or carbon-vanadium steel is still quite generally used because of the hard case and the tough core that results on the hardening of such steel. High-carbon high-chromium steel has been used, and though it wears exceedingly well there is usually always considerable danger of breakage.

For forming dies which are used wholly for the forming of cold material carbon or carbon-vanadium steels are still most preferable. The shock involved in the use of a tool of this type is enormous and the tool may fail from sinking, chipping, breakage or wear. Because carbon tool steel or carbon-vanadium tool steel hardens with an intensely hard case, the depth of which case can be somewhat regulated by the quenching temperature used, and because the hard case is backed up by a soft core seems to adapt this type of steel better for cold heading than any type of steel which has yet been developed.

# Wage Incentives in Manufacturing

Must Be Large Enough to Bring Forth the Results  
Desired—Penalty Clause Desirable —  
Payroll as an Investment

**A** GREAT problem before industry today is to obtain lower costs for the manufacturer while at the same time increasing the earnings of the employee, said D. B. Kift, general superintendent, Edison Electric Appliance Co., Chicago, speaking before the Chicago meeting of the American Society of Mechanical Engineers. His paper was entitled "Management Factors and Responsibilities Preliminary to and Coincident with Installation and Operation of Wage Incentives."

For a great many years shop employees have been given this form of consideration; less attention, however, has been paid to office employees, and right here is a large waste. Mr. Kift cited many instances, from the operation of his own plant, to prove the points he made. He said that every person in the plant, from the general manager down to the sweeper, is working on some form of wage incentive plan.

#### Double Bonus Arrangement

He told about certain foremen operating on a group bonus plan who got up to about 35 per cent bonus and then stayed there, week after week. Investigation showed that they thought that was about all the company would permit them to earn, in addition to the regular daily rate. In such a case the foreman was put on a further bonus, based on cost of unit output. This cost then dropped far below what it had been, and stayed down.

Best results obtainable are those achieved when the gang is working steadily all day long, but not at a pace which will tire them out. The so-called speed artist does not last. At the same time he is a good man to have had around, because the other men learn something of his short-cut methods to get results and a certain portion of this stays with them. All plans for carrying out incentive wage problems must be kept up-to-date with the times as conditions change, if full benefit is to be had from them.

#### What an Incentive Plan Must Involve

Fundamental principles indicate that the employee's compensation should reflect his contribution to the company's success. The plan must contemplate a sufficient increase in the man's earnings to induce him to increase his production materially; this means that he must gain 20 or 25 per cent or more over his daily rate. The plan must promote team-work.

It must have sufficient flexibility to fit in with changing conditions. It must be unlimited in its application. It must be sufficiently simple in operation so that it will take a minimum of clerical help to keep it going. It must be fair to both employer and employee and thus promote mutual confidence between them. Every one is hired, under such a plan, for a very definite purpose, and it must be possible to measure his contribution to the general success.

#### Cooperation for Profit of All Concerned

Detailing department after department, the speaker showed how different kinds of difficulties were met and overcome by special treatment in each case. He pointed

out that the installation of such a system on a rational basis makes thinkers out of the department heads. They never attempt to put through wage increases for friends or relatives, but they are eager to put them through for men who are capable of earning them.

Most incentive plans need a penalty clause, to take care of cases which come up every once in a while, to correct conditions not reached directly by the regular methods.

Groups of men which are too large or too small fail to get the best results out of such a plan. In his own work Mr. Kift has found that a group of from 20 to 30 men or girls appears to be about the right size to obtain most satisfactory results.

#### Executive and Cost Phases of Wage Incentive Plans

**A** NOTHER method of getting at this question of wage incentives was taken up by John Paul Jones, of the Standard Oil Co. of Indiana, Chicago, in a paper of which the title is given above. He stated that management must pay according to the value of the work produced by the man or the group receiving the pay. Progress in compensation methods rests essentially with management as a whole.

Payrolls are to the management an investment on which a return must accrue both to the company and to the workers. The more return which is obtained from the payroll investment, the more satisfactory becomes the particular cost of the product turned out. Wage incentive plans thus should be devised to make the payroll investment give greater returns to both employer and employee. Payrolls may be heavily increased, if thereby some other cost is cut by a greater total amount.

#### Competent Planning Essential

An adequate survey will result in having the supervisor do much to help a man do his work. Planning of the whole system is an essential to accomplish this result and to set responsibilities.

Both job values and task values must be carefully studied. How much money is to be paid for a job and how much work is to be done have to be thought out in advance; at the same time, a measuring device must be had to determine the work done.

Incentives should be large enough to bring out the required or desired results. Labor relations on this basis must be based on sound facts and not on preconceived ideas.

#### Method of Handling Penalties

**A** NY incentive plan, to be a thorough success, must be based on something like a fifty-fifty split of benefits between the company and the wage earner, it was brought out in the discussion.

Wage incentives, as we know them, said George

(Concluded on page 836)

# Large forgings now being nitrided

New Jersey Forge Company installs large oil-fired furnace for hardening rolls and locomotive forgings

So large a demand for nitrided forgings has sprung up that a large plant in the Philadelphia district has put in a nitriding furnace for supplying the needs of its customers. The Camden Forge Co., Camden, N. J., has now in operation one of the largest furnaces in the country for case-hardening forgings with ammonia gas. The new demand is coming from railroads, which are experimenting with nitrided forgings for locomotives, from plants which use certain types of steel rolls and from other companies interested in the possibilities of this new development.

#### Large Oil-Fired Nitriding Furnaces

A feature of the new furnace of the Camden company is that it is oil-fired—probably the first one of this type in existence. It is of the usual car type and on the car is the nitriding box, which is 11 ft. 7 in. long, 30 in. wide and 36 in. deep, making it possible to treat forgings within these dimensions. The nitriding box is made of a 20 per cent chrome-iron alloy which is, of course, heat-resisting. The furnace was built by Ryan, Scully & Co., Philadelphia.

One large railroad has placed orders for nitrided forgings for bushings, cams, pins, hangers, gears, guides, etc.,

for six locomotives. The idea is to compare the wearing qualities of these forgings with those of alloy steel and other types. Larger forgings of the nitrided type also are being produced.

#### Nitrided Rolls for Paper Mills

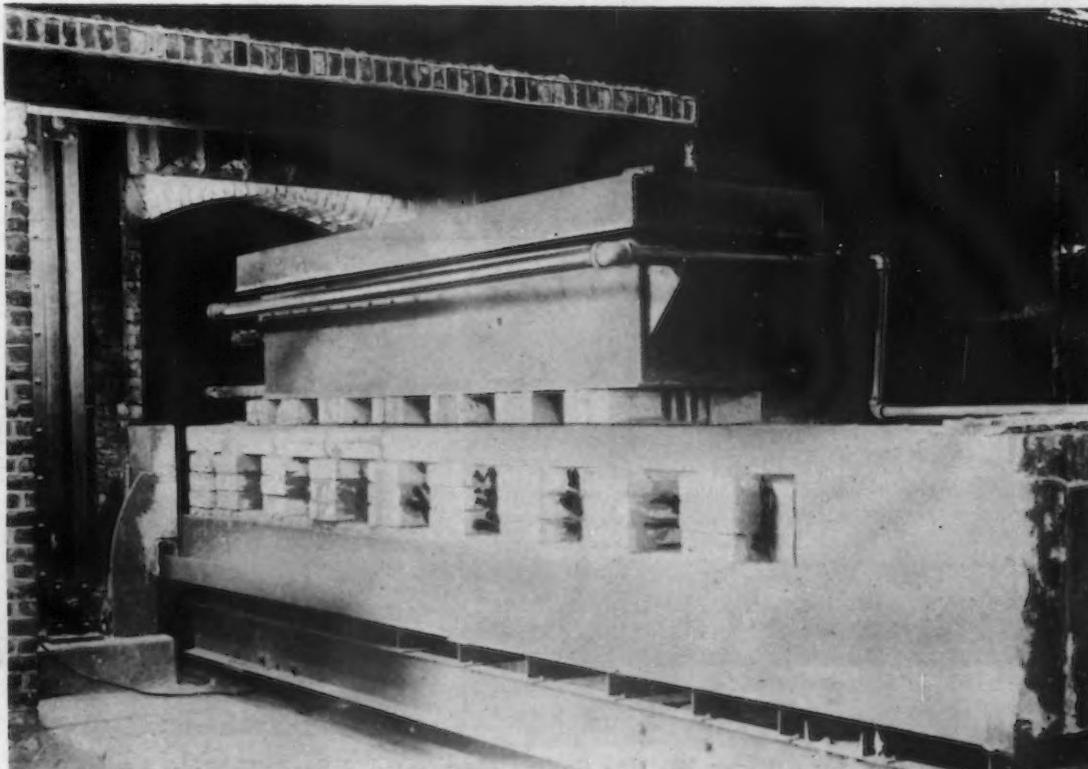
One of the most interesting developments thus far is the decision of a large paper mill company to use nitrided rolls. It is claimed that they will not only surpass alloy steel rolls in hardness but that the life in rolling corrugated paper will be much longer, or sufficient to offset any extra cost. The size of these rolls, which are hollow bored, can be apprehended from one of the illustrations. Some of the other forgings which have already been nitrided by the Camden company are shown in other illustrations.

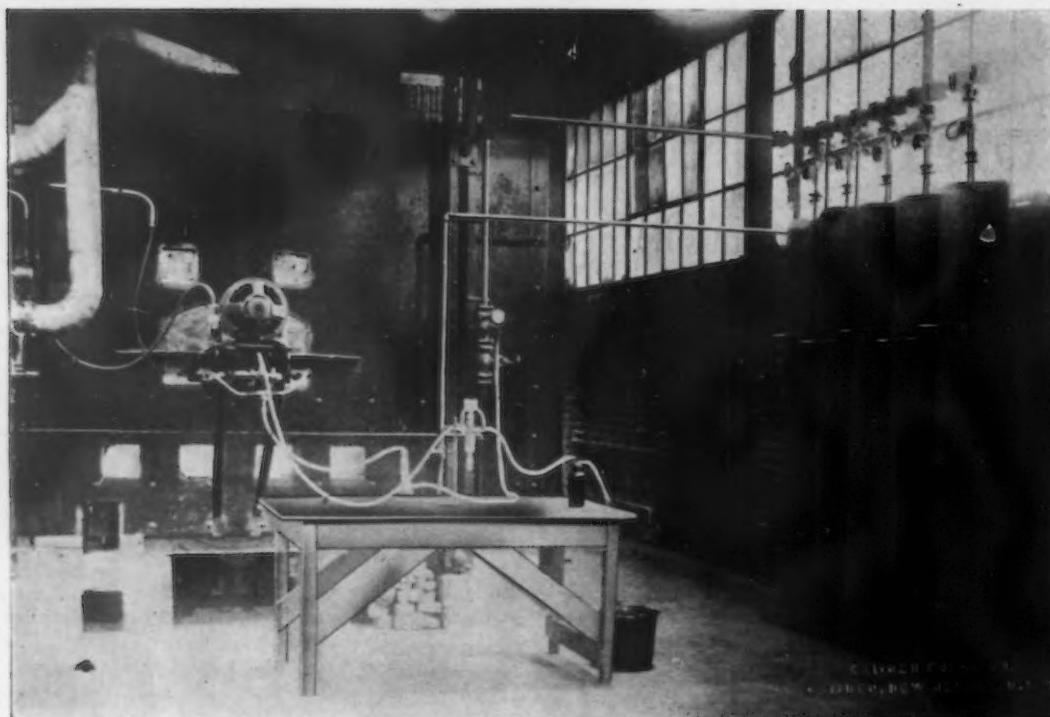
#### Steel Used for Nitriding

A word about the steel used for nitriding. It is a special alloy steel containing aluminum (1 to 1.25 per cent), chromium (1.50 to 1.75 per cent), molybdenum (0.15 to 0.25 per cent), with silicon 0.20 to 0.30 per cent and manganese 0.40 to 0.70 per cent. The carbon is from 0.10 per cent up and the steel is usually open-hearth or electric.

Extremely wide physical properties are possible, de-

NITRIDING  
Box, 11 Ft.  
Long, in the  
New Oil-Fired  
Furnace of the  
Camden Forge  
Company





OTHER End  
of the  
Nitriding Furnace Showing  
Apparatus for  
Introducing the  
Ammonia into  
the Box

pending on the heat treatment. The following are the ranges:

Yield point, lb. per sq. in.....	60,000 to 180,000
Tensile strength, lb. per sq. in....	80,000 to 225,000
Elongation, per cent.....	35.0 to 10.0
Reduction of area, per cent.....	70.0 to 35.0
Brinell .....	160 to 445

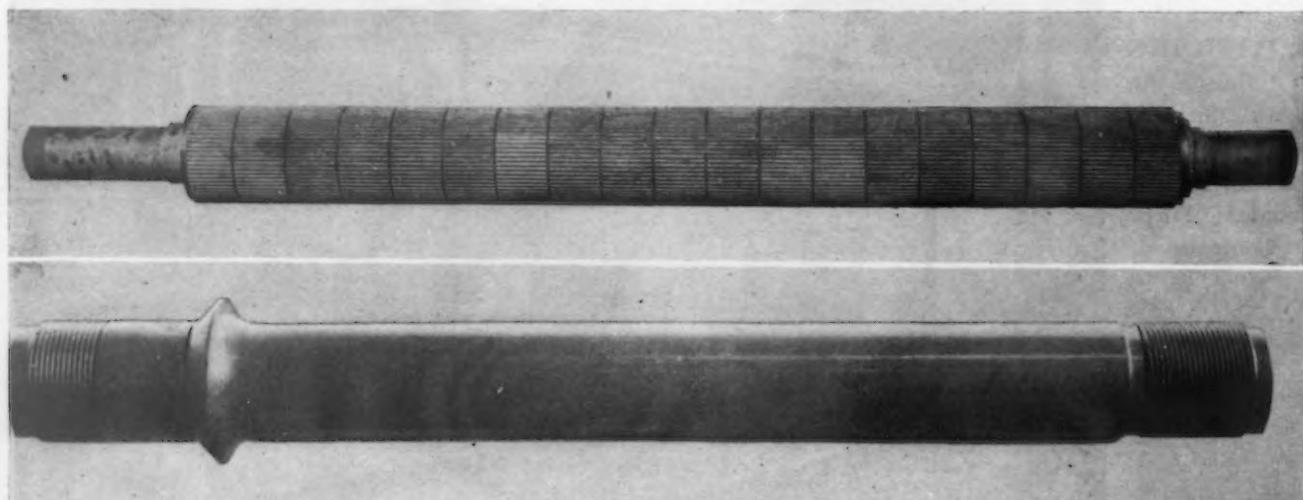
The hardness resulting from the nitriding process is about 1000 Brinell, supported by a core which has not been affected. Thus the engineer can have at his command a machinery part of any desired strength, accompanied by a surface of the highest known resistance to wear. The thickness of the case varies from 0.001 in. to 0.031 in., depending on the length of exposure to the ammonia gas and the temperature. If the nitrided part has been properly annealed before hardening, there is no warping or distortion and the growth in dimensions is only slight, about 0.002 in. Changes in dimensions are most noticed in rings. With very thin wall space, the increase in the outside diameter averages about 0.5 per cent and the

increase in wall thickness is about 0.0005 in. to 0.0007 in. on every face.

#### Some Possible Uses of Nitrided forgings

New possibilities in design are thus offered the engineer. It is pointed out that in the automobile, such parts as cams, helical gears, timing gears, steering mechanism, pump shafts, etc., are ideal subjects for nitriding. Also valve seats or any parts subject to the erosive action of gases or liquids. It may require boldness, however, for the engineer to apply the process to such parts as locomotive axles in order to help solve lubricating problems for a hard surface as an aid to lubrication.

The application of the nitriding process is regarded as in its infancy. But there is the possibility of being able to nitride Diesel engine piston rods, large crank pins, and some types of running nuts subject to constant wear as in steering engines. The Camden Forge Co. is confident that, more and more, large and still larger forgings will need to

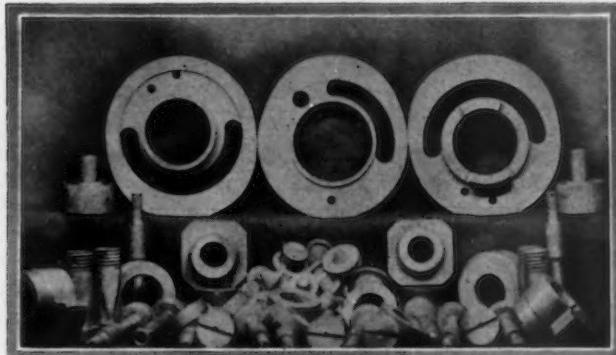


Large Nitrallloy Roll for a Paper Mill for Rolling Corrugated Paper. This was hardened in the new furnace.  
A nitrided piston rod for a Diesel engine

be nitrided, and it has therefore installed the necessary apparatus which thus far has been working successfully.

#### Tendency in Heat Treatment of Alloy Steel forgings

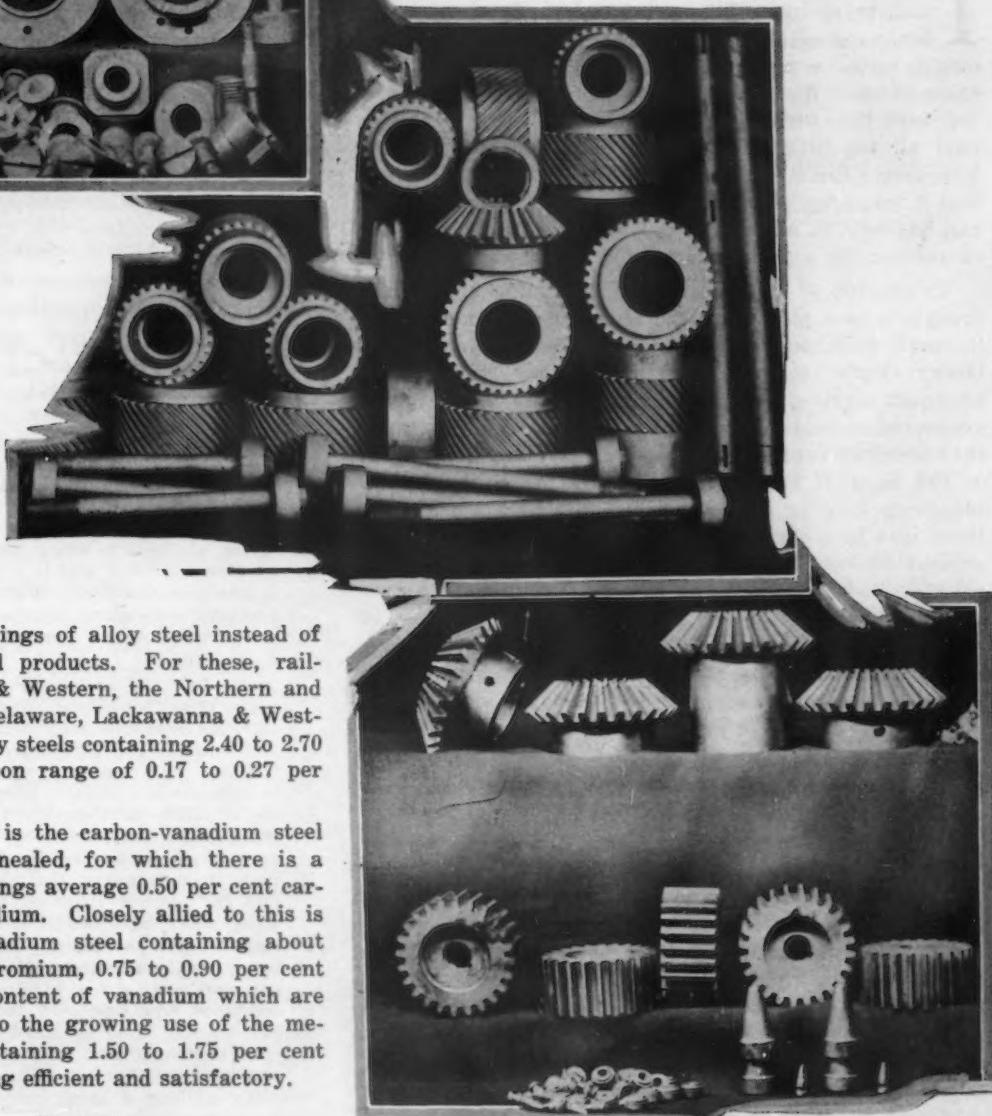
Besides the development in nitrally steel forgings, the Camden company is turning out several interesting products in its large plant, which is equipped to make forgings from small ones of all sizes up to very large marine forgings. Prominent among these are forgings for locomotives of many types. In these the tendency is to use



COLLECTION of  
Small Nitrided  
Forgings (Above)

\* \* \*

Miscellaneous Gears  
and Other Forgings  
Which Have Been  
Hardened in Ammonia (at Right)



normalized or annealed forgings of alloy steel instead of the quenched and tempered products. For these, railroads such as the Norfolk & Western, the Northern and the Union Pacific, and the Delaware, Lackawanna & Western are using low-nickel alloy steels containing 2.40 to 2.70 per cent nickel with a carbon range of 0.17 to 0.27 per cent.

In the same class there is the carbon-vanadium steel forgings, normalized or annealed, for which there is a steady demand. These forgings average 0.50 per cent carbon and 0.18 per cent vanadium. Closely allied to this is the low-carbon chrome-vanadium steel containing about 0.20 carbon, 0.45 to 0.55 chromium, 0.75 to 0.90 per cent manganese and the usual content of vanadium which are in high favor. There is also the growing use of the medium manganese steels containing 1.50 to 1.75 per cent manganese which are proving efficient and satisfactory.

#### A Large Alloy Steel Liner

Among miscellaneous large forgings the variety and type is large. Prominent among these are quenched and tempered liners. This is a chrome-nickel-molybdenum steel which has the following composition and physical properties after heat treatment:

	Per Cent		Per Cent
Carbon .....	0.320	Silicon .....	0.190
Manganese .....	0.700	Nickel .....	2.350
Sulphur .....	0.031	Chromium .....	0.620
Phosphorus .....	0.032	Molybdenum .....	0.31

Lb. per Sq. In.	Per Cent
Elastic limit.....	130,000
Tensile strength...	152,000

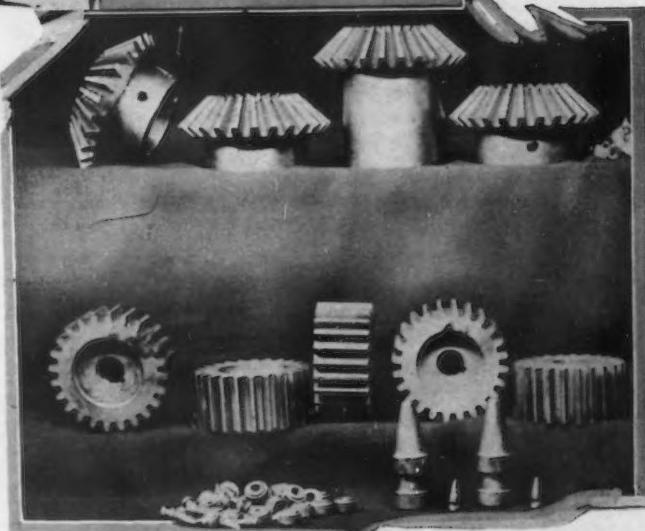
  

Lb. per Sq. In.	Per Cent
Elongation .....	18.5
Reduction of area...	55.0

These liners are being incorporated in lead extrusion presses where maximum toughness and hardness are required.

Among other quenched and tempered forgings, which are now the vogue, are sugar mill rolls containing 3 to 3.50 per cent nickel; eccentric shafts with 0.90 to 1.10 per cent chromium and 0.20 per cent vanadium with an elastic limit of 100,000 lb. per sq. in., and tungsten-chromium forgings having 1.75 to 2.25 per cent tungsten and 1.50 to 2 per cent chromium.

The Camden company is particularly well equipped to handle heat-treated forgings of any of these and other types, nitrided or not. It has large heating furnaces and quenching tanks as well as annealing and normalizing furnaces. And in its large plant there are hammers and



presses with various capacities, making it possible to economically handle forgings up to 100,000 lb. The plant is also well equipped to do finish machine work to exacting tolerances.

A brief description of experiments on 300-ton foundry blast furnaces is given by S. P. Kinney in Bureau of Mines Report of Investigation No. 2983. Charges of carefully sized ore, coke and stone were made, and it was found that when a round containing coarse ore was followed by a round containing fine ore (a practice termed "layer filling") a greater burden could be carried with a corresponding fuel economy.

# Economic Aspects of Sponge Iron

## Three Fundamentals for Economic Success—Comparison with Scrap Justified—Advantages and Disadvantages of Its Use

BY BRADLEY STOUGHTON\*

IT is very easy to reduce iron ore at a temperature well below its melting point and produce a more-or-less-pure metal which can be used directly for implements, tools, or machines. This simplicity has been the cause of much financial loss by persons who were so satisfied with the successful operation of a process that they paid all too little attention to its commercial aspects. How easy a direct process is may be gleaned from the fact that it was practised with some success by primitive man, and has been in almost continuous operation in one form or another for a period of probably 4000 years.

Production of steel in ton lots, beginning about 1860, brought a new phase into the economic situation, which, however, had been already greatly modified in 1784 by Henry Cort's invention of purifying pig iron. Direct processes survived both of these revolutions, under special geographical conditions, even up to the last few years of the nineteenth century, but ceased to have any general use as the basis of supply for structural, machine, or tool industries even in countries which could have manufactured iron by a direct process, but, instead, imported the product of established processes. And this is still the situation today, notwithstanding the invention of an incredible number of "new" processes since 1900, most of which are abandoned, and only survived as long as their financial backers were willing and able to lose money. Probably none of these processes failed to work pretty well, and all seemed to show a handsome profit on paper.

Those who are sufficiently interested will find a voluminous literature on the subject distributed through the appropriate technical magazines and proceedings of technical societies.<sup>†</sup> A symposium on the subject was held by the American Electrochemical Society in May, 1927, during which the present writer aroused a bitter discussion (he regrets to say) by the inventors of direct processes present because of opinions which he ventured to advance on economic principles relating to direct processes. Up to the present time, however, the principles then advocated appear to have been sound. The circumstance is mentioned now to anticipate any expressions of resentment which might be aroused here, because of comparisons to be made. It seems as if an honest expression of opinion were demanded in view of the several millions of dollars which have been wastefully spent on direct processes during the past 25 years.

Of course, a direct process must work smoothly, uni-

\*Head of metallurgical department, Lehigh University, and consulting metallurgist, Bethlehem, Pa. Abstract of a paper delivered at the annual general meeting of the Canadian Mining and Metallurgical Institute at Toronto, March 6 to 8.

<sup>†</sup>See especially: F. Wuest, "Die direkte Erzeugung des Eisens"; *Stahl und Eisen*, vol. 47, pt. 1, 1927, pp. 905-915 and 955-965. E. Fornander, "The Direct Production of Iron," *Chem. & Met. Eng.*, vol. 30, 1924, pp. 864-868 and 907-910; a history. H. Loebner (a complete history of the direct process in all countries from 1900 to 1925), *Montanistische Rundschau*, vol. 18, 1926, pp. 623-636. See also: *The Canadian Mining and Metallurgical Bulletin* for January, 1925; and Canada, Department of Mines, "Investigations in Ore Dressing and Metallurgy," 1925 and 1926, and recent volumes of *Iron and Steel in Canada*.

formly, and satisfactorily before it can be a success. Fortunately, this is comparatively easy to accomplish. But, just because a process operates satisfactorily, we have no indication of its commercial success. We might liken this to a minister of the gospel: A clergyman must be honest, of course, but, just because he is honest, is no reason to choose him to invest our money for us. This simple truth is so often overlooked, in evaluating a direct process, that I have repeated it here for emphasis.

### Three Fundamentals for Success

The economic success of a direct process depends on three fundamental questions:

1.—Can it produce a finished product which requires no remelting before it can be marketed at a fair price in competition with other metal for use in a structure or machine? This question is now almost invariably answered in the negative, so we may pass to the next one.

2.—Can it produce a melting material at as low a price as steel scrap? This is the question which commonly arouses resentment: To compare a man's product to steel scrap, in value, is as offensive as to doubt the virtue of Caesar's wife. Yet this comparison was made by Howe in 1889, and it is as true today as it was then. It has been abundantly proved by the history of the direct process, and might appropriately be engraved on the tombstones in the appropriate graveyard—a very full graveyard.

3.—Can the makers obtain for iron sponge a price better than that of steel scrap? Usually they cannot, and this has been the most common cause for the demise of direct processes. But under rare circumstances, a sponge iron has the property of uniformity and very low content in impurities, especially phosphorus and sulphur. This is the situation with sponge iron being made in Sweden at the present time, and the manufacturers are obtaining approximately double the price of scrap for it. It is understood, however, that this is used as a melting material for electric furnaces in the production of quality steel, which also brings a high price. The phosphorus, sulphur, and manganese in this material are uniformly below 0.025 per cent. The carbon is very regular and not more than a few hundredths of a per cent, including combined and free, and there are no objectionable impurities. It is to be noted that the demand for quality steel is limited, and this, of course, limits the amount of raw material that can be used for its manufacture, especially as only a small proportion of the melting charge for high-grade steel can be made of sponge iron.

### Comparison with Scrap

Steel scrap is a standard melting material for open-hearth and electric furnaces. Its value for this purpose is dependent only upon its physical condition and its purity: by physical condition we mean its degree of fineness, which determines the extent to which it is oxidized and wasted during melting; and, by purity, we mean freedom from sulphur, phosphorus, nickel, copper, chromium, as well as oxygen and like elements which are difficult to discover, but which are not removed during remelting and therefore injure the final product. Consequently there is nothing invidious in comparing sponge iron for remelting with steel scrap of a satisfactory standard. On the con-

trary, such a comparison is merely transforming an academic and technical problem into one which is practical and commercial. Granted that steel scrap is available, suitable for the remelting problem before us, then a comparison between it and sponge iron will depend on price and nothing else.

The price of scrap is often based largely on the necessity of transporting it. Many machine shops, etc., will dispose of steel turnings and borings at a very low figure if the purchaser will take them away from the plant at his own expense. The objection to such material is that it often is mixed with brass, nickel steel, stainless steel, etc. The resulting copper and nickel will not be removed during the melting operation, which makes the properties of the steel uncertain. Chromium from stainless steel is a serious detriment in melting. Machine-shop scrap is also liable to be uncertain and heterogeneous in analysis. Sponge iron is superior to ordinary machine shop scrap in the respects mentioned, provided, of course, the sponge iron is of uniform good quality. But machine shops now often keep their different kinds of turnings in separate lots, knowing that they can thus secure a better market.

In steel melting centers in the United States, subsequent to the close of the World War, steel scrap has varied in price from \$7 to \$30 per ton, depending on the demand, condition, purity, etc. Obviously, low-phosphorus scrap suitable for acid open-hearth melting will command a higher price than basic open-hearth raw material, and heavy melting scrap is worth more than trimmings from thin sheet, de-tinned tin cans, borings, turnings, wire-scrap, and similar material which would suffer much oxidation and loss in melting. I have not been able to secure corresponding figures over a period of years for Canadian centers, but doubtless these could be collected for any locality by interested persons in that locality. The lower prices should be used as a basis of estimating possible profits on a sponge iron project, rather than the higher ones, because an industry may have to subsist during a somewhat extended period of low prices.

In the matter of physical condition, sponge iron is usually worth a lower price than scrap unless it has been briquetted, which means an extra expense. Economy in the direct process means that complete reduction of the ore should not be attempted. This is liable to produce heterogeneity in carbon and admixture of slag and unreduced oxides. The slag and unreduced oxides have proved to be no serious objection, because they float out of the metal when it is melted; but the non-uniformity in carbon must be controlled, because it gives an uncertain product irrespective of whether the carbon is in the form of coal, graphite, soot, or combined carbon.

#### Summary and Conclusions

*Advantages of Sponge Iron.*—Sponge iron contains no nickel, copper, chromium, etc. Nickel and copper, which do not oxidize in the open-hearth furnace, are accumulated in steel scrap and become yearly a more serious problem. Sponge iron is also low in combined oxygen, and this may be an important factor in improving the quality of steel. Steel which has been oxidized by a black slag in the electric furnace can never be de-oxidized to the same quality; steel scrap which has been oxidized in an open-hearth furnace gives a lower quality crucible steel after remelting than does wrought iron. Just what the reason is for the difference is still somewhat uncertain, but undoubtedly this matter is of importance. Sponge iron also may contain some special element like vanadium, which improves the quality of the steel bath in which it is melted. It also is usually mixed with gangue, and one manufacturer claims that the SiO<sub>2</sub> present in sponge iron serves to flux and collect non-metallic inclusions, FeO, etc., and remove them from the melted bath.

*Disadvantages of Sponge Iron.*—We have already emphasized the possibility of sponge iron being only partially reduced, being non-uniform in analysis, and frequently containing objectional impurities. The spongy condition of the material also makes it liable to be oxidized readily, so it can only be used as a part of the charge for melting in most types of furnace. The same texture makes it difficult to handle, and makes it absorb moisture in transportation. Usually, sponge iron is too high in price to compete with other materials which are equally good for melting purposes. In other words, it is not an economical melting material for tonnage steels unless it is very cheap.

*Conditions Which Make a Sponge Iron Industry Economical.*—The greatest possibilities for the success of a sponge iron industry are the following:

Rich ores either very low in phosphorus and sulphur or else very low in price.

A reducing agent and fuel which is low in sulphur.

A reduction process which is complete in one operation. (Of course, the ore may be concentrated previous to the metallurgical operation without violating this condition.)

A process that will produce a reasonably uniform product.

Either a nearby market for a goodly amount of high-quality steel for which high prices are paid, or else an assured scarcity of steel scrap at ordinary prices in combination with a lack of fuel suitable for blast furnace smelting.

An explanation of some of these *desiderata* may be necessary:

The direct process has this disadvantage as compared with the blast furnace, namely, that it cannot easily flux off sulphur. Therefore, any phosphorus or sulphur in the ore or fuel will be dissolved in the product. A high-phosphorus melting material could not be used for the acid open-hearth process and requires an oxidizing slag in the electric process, which lowers the quality of the electric steel. Melting material containing more than 0.08 per cent of sulphur also requires the use of two desulphurizing slags in the electric furnace.

A one-operation process is very much cheaper than one requiring two or more steps. It has been found that one operation, even if it does not completely reduce the iron from the ore and consequently gives a product with admixture of oxides and gangue, seems to be an economic necessity, and such a melting material has not serious disadvantages. However, it seems to be a condition of the direct process that it cannot remove much gangue, so that a rich ore is essential for raw material.

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Investigations made during 1929 at the Woolwich arsenal (England) have shown that "pitting," which greatly diminishes the protective value of thin deposits of nickel, and affects deleteriously the mechanical strength of thicker deposits, such as are needed for building up worn or undersized parts of machinery, can be largely prevented (1) by the preliminary coating of the metal with a thickness of not less than 0.0003 in. of electro-deposited copper before the final deposition of nickel is made, and (2) by the careful control of the acidity of the solution within quite narrow limits.

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Protection of aluminum against corrosion by a plating of zinc has been studied by the British air service. Successful experiments have been made on a small technical scale with zinc sulphate and zinc cyanide baths; and test pieces of aluminum, protected by zinc in this manner, have been subjected to severe corrosion tests, with satisfactory results. This work has involved an immense amount of detailed investigation on the effect of current density, concentration and acidity of solutions, and of the addition to the solutions of colloids such as gum arabic.

# Causes of Defects in Copper Wire

Effect of Improperly Designed Drawing Dies—Poor Drawing Practice Causes Check Marks on Wire's Surface

**T**WO serious manufacturing troubles known as "check marks" and "cuppy wire" were discussed by H. C. Jennison, assistant technical superintendent American Brass Co., Waterbury, Conn., in a notable paper entitled "Certain Types of Defects in Copper Wire Caused by Improper Dies and Drawing Practice," delivered at one of the Institute of Metals sessions in New York, Feb. 19. Check marks are slight tears on the surface of the wire; when accentuated they form "crow feet," or triangular surface imperfections with a sharp angle pointing in the direction of drawing. Such wire breaks easily and is brittle at the checks. Check marks occur in line, one behind another, in short stretches, three feet long or less, and are responsible for many breaks on the wire machines and much lost production.

Mr. Jennison believes check marks are the result of excessive draft at the broken surface and this in turn is generally due to dies with bells of too wide an angle, like Fig. 1. It is practically impossible to keep the axis of the wire in line with the axis of such a die, and the result is over-draft on one side. The situation is corrected by cutting the dies with an almost parallel exit bearing, as shown in Fig. 2, of length equal to the radius of the wire produced. Owing to the high angularity of bell B, such a die wears rapidly, and as soon as bell B encroaches much on the bearing, checked wire is liable to be produced. Consequently a die as shown in Fig. 3 is preferred. As long as it is maintained in this shape, with smooth surface, and the wire is not permitted to whip back and forth as it enters, no checked wire will be produced in copper meeting American Society for Testing Materials specifications.

According to Mr. Jennison, "cup and cone" defects are due either to dies with high angularity, to unduly light drafts, or to stretching the wire as it passes between dies on a continuous machine. These internal ruptures are found by tensile tests, and the tip of the cone fracture always points in the direction of wire drawing. As the in-

ternal ruptures draw out into cavities the surface of the wire at the spot is somewhat depressed. Too sharp an angle on bell B (Fig. 1) will cold work and toughen the surface of the wire, but this effect will not extend to the center, and cuppy wire will result. An angle of 15 deg. on bell B seems to be the limiting value for uniform work throughout the cross section of the wire. A die like Fig. 3 will not cause the defect even if reductions are very light, or if intermediate annealing is neglected. That much trouble is due to improper drafting on continuous machines may be proved by removing the dies and drawing copper from the same bar through them one after another on a single block, whereupon defective wire is no longer produced.

Dies of the type illustrated in Fig. 3 can be readily made of chilled iron with standardized tools. First see that the face is smooth and the reamer axis is normal to it. Then cut the face with a 125-deg. reamer. A 15-deg. conical hole is next cut through the die blank, driving the tool through until the hole on the finishing side is 92 per cent of the intended gage. Then a 5-deg. reamer is driven through to produce the exact gage at the face. Then smooth the entrance with the 35-deg. reamer.

An animated discussion indicated that many wire makers were unwilling to absolve the quality of copper from all blame for these defects. W. E. Remmers said that at the Western Electric plant a die similar to Fig. 3 (except that the bell B is 25 deg.), made to close tolerances by standardized tools, had been used for five years. Nevertheless a couple of years ago cuppy wire bothered them at intervals for a total period of six weeks, and was not suppressed even when the dies were lapped to size by skilled diamond die makers and checked for shape on a comparator. It is his opinion that check marks would occur even when drawing conditions are correct when the oxygen content in the wire bars is too low; cuppy bars, on the other hand, are favored by too high oxygen. Bars

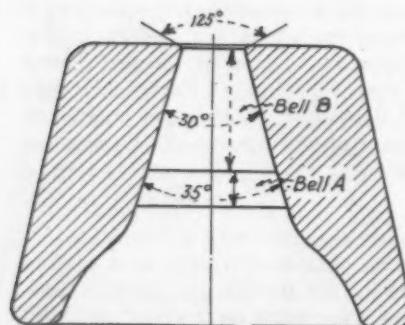


FIG. 1.—Die With 30 Deg. Bell and No Bearing, Which Will Always Produce Check Marks

FIG. 2.—Die With 30 Deg. Bell and a Bearing, Which Will Not Produce Check Marks When Die Is New

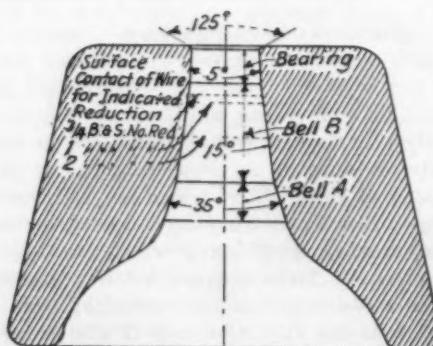
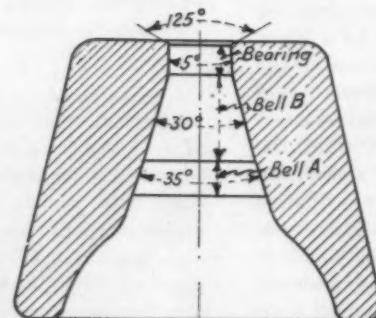
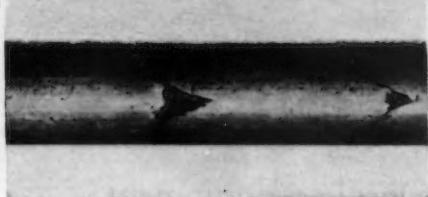
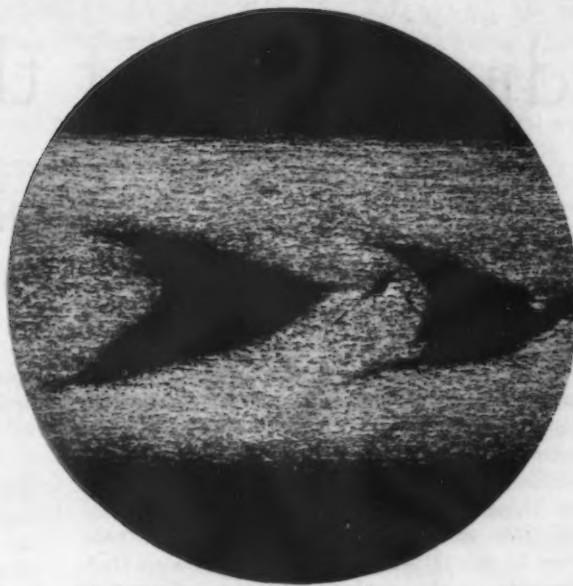
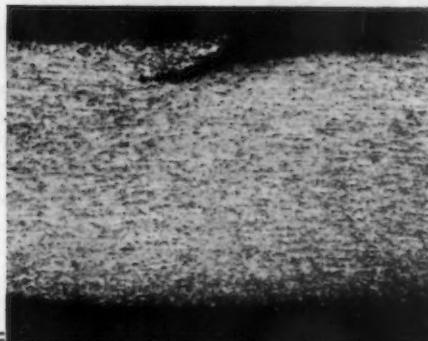


FIG. 3.—Typical Chilled Iron Die of Proper Design Which Will Not Produce Check Marks Even When Old



CHECKMARKS (magnified) on Surface of Copper Wire and Cross Section Showing Depth of Defect (Above and Below)



MAGNIFIED Cross Section of Copper Wire Showing Internal Ruptures Responsible for "Cuppy" Fractures

analyzing 99.94 copper and 0.04 to 0.05 oxygen will produce wire free from these defects—an experience supported by another speaker.

Others emphasized the fact that the sequence of reduction is a controlling element. If alternate heavy and light drafts, such as

47 per cent, 27, 36, 21, 25, 20,  
or 14½ per cent, 25, 16, 25, etc.,

are given the wire, cuppy fractures are liable to occur. Furthermore, cuppy wire may occasionally be produced if, say, No. 12 wire is drawn in new dies similar to Fig. 2 by 10 reductions, but seldom if the work is done in seven.

To many suggestions that tough pitch copper conforming to A. S. T. M. specifications is not an absolutely uniform product, heat to heat, or bar to bar, or even top to

bottom of the same bar, the author in closing stoutly maintained that these admitted irregularities were too small to cause trouble if the drawing equipment is in good shape. W. H. Bassett also emphasized that considerable good copper was gassed during reheating for rolling into rods. Cracks in wire bars (most readily discovered by dipping into kerosene, wiping carefully, and dusting with fine chalk) are quite independent of the quality of the metal, being principally due to restraint by the molds during solidification. Good copper could also be spoiled for wire by deep guide scratches, rolled-in fins and other rolling mill defects. But he testified that A. S. T. M. specification copper, when rolled correctly into rods, could be drawn at almost any speed and with no limit to the amount of reduction, without annealing, if the dies were made right and the drawing equipment properly adjusted.

### Efficiency of Multiple-Operator Welding Generators

RELATIVE economy in the use of a multiple-operator versus a single-operator arc welding set is discussed by J. W. Owens, director of welding, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., in the February issue of *Marine Engineering*. At his plant several 1250-amp. sets with two or more outlets have been installed in substations adjacent to the ways and cables run overhead to the work. Other sets are mounted on rigid bed plates with crane hooks for placement wherever there is a concentration of welding. Single-operator sets are used only when a small amount of work is to be done in remote parts of the yard.

"The influence of the utility factor on the efficiency of multiple-operator sets is not pertinent when a large number of welders are employed," writes Mr. Owens, "as the diversity factor insures the maintenance of a relatively constant load on the machines. The less the current per arc, the greater the number of circuits supplied, and with average loads of 60 per cent or less of the connected load, the greater will be the efficiency of and the lower will be

the investment for multiple-operator sets. While it is necessary to consider electric efficiency, nevertheless this factor can be overstressed when it is considered that the cost of current is only a fraction of the cost of labor.

"Experience in the Newport News yard since 1918 has shown that the most important reasons governing the choice of multiple-operator sets for general shipyard use are their low first cost, low cost of upkeep and the extreme portability of the units for controlling the resistance. In no case have any of the multiple-operator sets been shut down for repairs from normal operating conditions, whereas experience has shown that at least 10 per cent of the single-operator sets are always in the shop for repairs. A recent analysis, made by our yard, indicated that, on the basis of 100 welders, our cost of welding would be \$16,000 greater a year if single-operator, variable-voltage sets were installed, and \$20,000 greater if the advantages of portability for the resistance units of the constant-potential sets are taken into consideration."

# Readjustments of the Machine Age

## Problems of Displaced Employees and Obsolete Equipment

### —Flexibility in Steadily Changing Industries—

### Transferring Skill to Machines

INTRODUCING the general topic of the morning's session\* of March 5, Ernest F. DuBrul, general manager, National Machine Tool Builders Association, Cincinnati, made a strong plea to industry to take advantage of present slow employment conditions and low prices to put in new and improved equipment, and thus be in position, when things begin to go rapidly again, to go along with the tide and get full benefit from the cost savings inherent in the latest equipment. He stated that most manufacturing plants are not doing this. Even the automobile manufacturers, who have been such foes of obsolescence, are slow in re-tooling their plants at present.

Today in the United States there are perhaps 10,000 machine shops making production tools not only for themselves but for use in all other industries.

Plants having a large number of obsolescent machines show that the management has not organized for prosperity. The mere presence of obsolete machines is in itself an indication of obsolete brains in some executive's head, whereby he reverses the philosophy of the machine age from "Save the man and spend the machine" to "save the machine and spend the man."

#### Better Control of Production

There is a distinct social duty of management to work hard on the problem of rationalization. This is what Frederick W. Taylor, in an earlier age, called "scientific management." We do not work to produce goods, so much as we work, in the final analysis, to produce a satisfaction of human wants.

We should organize so that we can make our needs in a shorter working week. One company has established four six-hour shifts, operating five days a week, and finds that it makes lower costs than when there were three eight-hour shifts, and still lower than was achieved with two twelve-hour shifts.

#### Oversupply of Employees

NO machine age can result in producing a nation of robots, according to Cyrus Ching, president of the American Management Association and director of industrial and public relations of the United States Rubber Co., New York. We are dealing with an entirely new group of people every generation and these people have totally different ideas from those of the preceding group.

In spite of the fears of those who "view with alarm" the displacement of workers by efficient machines, it is impossible for modern industry to go backward or for modern civilization to give up what it has gained. We cannot obliterate the telephone, the radio, the automobile, the electric appliances used in housekeeping, the automatic furnace, etc., and resume the living conditions of our fathers or grandfathers.

We have found that employees displaced by machinery have been taken up in one way or another in other forms of work. There are 450,000 people engaged in the tele-

\*American Society of Mechanical Engineers, national materials-handling meeting, Stevens Hotel, Chicago.

phone industry, 3,000,000 in the automobile industry, and 250,000 in the radio industry. All of these are of more or less recent development and all those people now serve us in these modern ways.

Even these recent industries have shown great progress in getting more work out of their employees year by year. In spite of this fact they have increased the number of employees and have turned out tremendously more product. Comparing 1919 with 1925, the Census Bureau shows that there has been an increase in output per man in the automotive industry amounting to 211 per cent. During that same period, however, the number of employees increased by 32,000.

#### Compensation for Monotony of Drudgery

Drudgery and monotony of repetitive operations came in for a share of attention. It is obvious that critics with artistic temperaments probably could not do any kind of a production job without finding it monotonous. Such a type of mind is not fitted for the industrial world. The speaker said, as a contrast with industrial conditions, that the most monotonous task he had ever had was when he was a boy on his father's farm, and he was tied down to the task of taking care of a herd of cattle which had to be milked seven days a week, shortly after sunrise and just before sunset.

As a compensating factor in repetitive operations the speaker pointed out the element of sociability and human contact. Most of these tasks are those not requiring much thought on the part of the worker, once the job is thoroughly learned. This feature Mr. Ching regarded as more than an offset for the monotony.

#### Management Can Smooth Over a Change

There is, however, a problem and a responsibility of management when a change in operations is to be made. Sometimes such a change becomes almost a catastrophe to the group of work people concerned. Generally they lack the flexible type of mind which would fit them for a change. On the other hand, to one who is accustomed to occasional changes any further change is a mere incident.

There is necessarily a heavy shock of readjustment to large numbers of people when changes throw them into other lines of employment. We must develop in our industries a type of man who is flexible enough to do a new operation when it becomes necessary. Management which is far-seeing enough can anticipate a change and prepare the workers for it in advance.

Specific example of this was given in which some machinery for doing certain work was going to be put in but could not be placed in operation for about six months. One skilled man after another, who had been doing the work with his own skilled hands, was put into other work. Consequently, on the day the new machines went into production, not a single man was thrown out of employment and all were doing work with which they were satisfied and at a satisfactory rate of pay.

Industries which have not made continual development

year by year are the ones in which these tragedies mostly occur. Development, when it comes, means a large and sometimes radical change, and it has to be made quickly. Thus it is those organizations which have developed too slowly, and not those which are developing so rapidly as to be largely in the public eye, which are responsible for most of the trouble of what we know as technological unemployment.

Doubtless our distribution system for what we produce, operating between the producer and the consumer, has not kept pace in efficiency with our production system. The matter thus becomes one of under-consumption rather than of over-production. If, because of this, we have to pay too much for some things, there is that much less which we can expend for other things.

#### Maladjustment a Fault of Management

Machinery cannot of itself produce unemployment. We are, at the same time, both a producing and a consuming nation such as has never been seen before. Unemployment is primarily a management problem involving maladjustment and not necessarily a machine problem.

Financial compensation to old employees who have to be let out through machine changes was recommended by the speaker. Many companies have some such system in vogue. A typical example was cited in which each such employee receives a week's pay for each year of service with the company—after he had been there a certain minimum period. This gives him an opportunity to re-adjust himself, find new employment and get into the new order of things. At the same time, the knowledge that such system is in effect is very helpful in maintaining morale in the organization.

#### Mechanization and the Worker

SOME exception was taken to what the previous speaker had said, on some topics, by Richard H. Lansburgh, of the First National Bank, Detroit, and formerly of the University of Pittsburgh. He stated that conversation along conveyor lines is practically out of the question. If the noise does not itself stop it, the foreman is likely to get in a new man who does not indulge in it. In some

late installations of conveyors the men are so far apart that they cannot talk anyway. It happens that the automobile industry, which was cited by Mr. Ching as an absorber of labor from outside, is one of the very ones in which we have largely these mechanization problems. The speaker doubted whether any of the figures given for employment in new industries had proved even a partial solution of the problem before us.

With regard to the radio industry, he cited a certain large plant which had 10,000 workers six months ago and only 1700 employees today. This appears to be, therefore, a most unstable type of industry and a creator of a large unemployment problem of its own, even though it happened that the 10,000 people working there last year had been drawn largely from a very slack textile industry.

There appears to be little problem in the machine tool industry from this source. Likewise, there is little trouble in those organizations which are wide-awake enough to keep their machine tool equipment up to date. There is, however, present everywhere, a desire and an urge to transfer the remaining skill of the skilled worker to the marvelous machines employed in modern industrial plants.

Large plants with a forward looking personnel policy try to take care of their displaced men. Small, scattered plants without a personnel policy necessarily throw them out to shift for themselves. In many of these cases the worth of a particular worker to his company has become but a fraction of the worth of the machine on which he works.

A recent survey in Detroit on the subject of unemployment and its connection with an age limit showed some unusual results. About 79 per cent of the employers responding to the request for information stated that the age limit was being affected materially by the mechanization of the plants. Group insurance was given by 70 per cent of the answers as having a similar effect in lowering the age at which workers will be employed. An even larger number, up to 83 per cent, said that pension systems have a definite effect in lowering the age limit and thus lowering the future responsibility of the company to take care of those workers who might become superannuated.

### Handling Weights on a Time Limit

ONE of the interesting features at a materials-handling session of the American Society of Mechanical Engineers in Chicago on March 6 was a film showing the method of handling rolls of paper by the Chicago *Daily News* from the boat or railroad car into storage and then on to the press and out to the street as completed newspapers. This film depicted the handling of a news story from a telephone booth in the suburbs to the delivery trucks of the publication in 17 min.

Many types of materials-handling equipment were shown in operation, carrying not only the paper stock and finished product, but the stereotype plates and other materials going into the work of producing a newspaper. The largest paper roll weighs 2200 lb.

This new building, now occupied by the *Daily News*, was virtually built around the materials-handling problem. The engineers were given information as to what weights had to be handled and at what speed. From this information they built up the complicated system whereby the work now proceeds. They did not attempt to tell the materials-handling companies who were invited to bid on the project the details of the equipment to be provided. They did give them definitely what was to be done and let them work out their own details.

Inasmuch as the time limit is so important a factor in

producing this most perishable product, everything was made oversize, to avoid delays from breakdown. This applies to motors, hoists, carriers and all other parts of the equipment.

### Quality of Steel and Sticking of Sheets

RESULTS of investigations as to how far the sticking of very thin sheets is affected by the quality of the steel are given by W. Titze in *Stahl und Eisen*, Vol. 49, 1929, page 897. An examination of ingots, blooms and sheets was carried out made from steel with titanium additions, copper additions, and no additions at all.

The bend test on hardened samples gives a good indication of the deep-drawing capacity of the sheet. An addition of titanium is strongly recommended in case of steel sheets to be used for pressed hollow ware. A copper addition is good for sheets under 0.2 in. thick, but not so effective as titanium as a deoxidizer. An oxygen content of over 0.015 per cent is likely to cause sticking; the higher the oxygen the worse the sticking becomes. The tendency to blister is also in proportion to the extent to which segregations of carbon, phosphorus and sulphur are present. The rolling temperature should be at least 2275 deg. Fahr. (1250 deg. C.) in order to weld up surface blowholes.

## Central Station for Light Scrap

### Crushed Steel Turnings and Cast Iron Chips Handled Mechanically Into Bins and Out to Railroad Cars

A 60-ton gondola car can be loaded with cast iron chips in 15 to 20 min., and a 40-ton car can be filled with crushed steel turnings in 45 to 60 min., by means of new scrap-handling equipment recently installed for the Waukesha Motor Co., Waukesha, Wis.

Steel turnings are gathered in the machine shop in a dump cart which is fitted with a steel-tray bottom. Surplus oil drains into the tray while the cart is being loaded and during the time it is in transit from the machine shop to the crusher shed. Cast iron chips are handled in ordinary wheelbarrows.

Turnings are dumped, by means of an automatic releasing lever, into a steel pan located near the turnings crusher. The operator scoops the turnings into the crusher hopper and the crushed turnings are discharged into a centrifuge pan which rests on

the floor. Oil is drained into another pan.

When the crushed turnings pan is filled it is raised by means of a chain hoist which is suspended from an overhead trolley rail extending from the crusher past the centrifuge to an opening in the floor above the elevator boot. The loaded pan is placed in the centrifuge for further removal of oil. When this operation has been completed the pan is removed by means of the hoist and the load is dumped into the elevator boot.

#### Turnings Crushed as Fast as Received

One operator utilizes his entire time in and about the scrap shed, the turnings being crushed as fast as they are received. Wheelbarrow loads of cast iron chips are dumped directly into the hopper, which is above the elevator boot.

The bucket elevator which carries

the cast iron chips or steel turnings, one class at a time, to the storage bins is a centrifugal discharge elevator, with 48-ft. centers, made by the Chain Belt Co., Milwaukee. It consists of 5-in. x 8-in. malleable iron buckets mounted every 16 in. on a single strand combination chain. It operates at a speed of 200 ft. a minute. The chain and buckets are inclosed in a No. 12 gage steel casing. A 5-hp. motor at the head end drives the elevator by means of spur gear reductions.

The lower end of the elevator discharge spout is equipped with a turn head and swivel section which is controlled by a cable operating about an indicator wheel mounted on the elevator casing above the loading hopper. The swivel section permits discharging into either of two compartments in the storage bin.

The storage tank is a two-compartment steel bin with a frame roof. One compartment has a capacity of 100 tons of cast iron chips, and the other a capacity of 65 to 70 tons of crushed steel turnings. Gates at the lower ends control the discharge to a single hinged chute directing into railroad cars on a siding.



Steel Turnings Crusher, Centrifuge and Hopper Above the Elevator Boot Are Served by a Chain Hoist Operated on an Overhead Rail



Crushed Turnings and Cast Iron Chips Are Stored in Separate Bins Located on the Roof. Gates control the flow of scrap through a single spout to railroad cars

# Scrap Institute Adds to Program

## To Broaden Survey of Industry, Promulgate Specifications for Sorting—Asks Open Bidding on Railroad Material

**A**T its second annual convention at the Hotel Stevens, Chicago, last week, the Institute of Scrap Iron and Steel took a number of steps which, the members of the institute believe, will further the work that has been done during the past year or more and benefit scrap dealers, consumers and producers.

A resolution was adopted expressing disapproval of any departure from open competitive bidding and fair awards in the marketing of scrap produced by the railroads. Another resolution authorized the officers of the institute to cooperate with the National Association of Purchasing Agents in segregating alloy steel scrap at points of production in order to keep heavy melting steel and other grades of scrap free from this kind of material. A third resolution created an annual award to be given to the individual either in the industry or outside of it who shall have performed notable service to advance the interests of the industry.

### Specifications for Scrap Sorting

Other action taken by the institute included the following:

It was decided to study and, with the help of dealers, producers and consumers, promulgate proper specifications for the sorting of scrap.

A survey of the amount of scrap handled by dealers and brokers is to be undertaken as a supplement to the survey of scrap consumption and production now being carried on by the institute.

The institute will cooperate with the National Automobile Chamber of Commerce in the plans of the automobile industry to scrap 400,000 old automobiles.

It was decided to make time the essence of contracts to deliver scrap entered into between brokers and dealers.

A field investigator is to be appointed by the institute to look into complaints against the code of ethics of the institute.

### Samuel N. Summer New President

Samuel N. Summer of the Joseph Schonthal Co., Columbus, Ohio, was elected president. The following additional officers were elected: First vice-president, George B. Doane, Perry, Buxton, Doane Co., Boston; second vice-president, Frank Parker, Briggs & Turivas, Blue Island, Ill.; third vice-president, Michael V. Bonomo, L. Schiavone & Bonomo Co., Jersey City, N. J.; fourth vice-president, William M. Hilb, Hilb & Bauer, Cincinnati; fifth vice-president, Ben

Cohen, Louis Cohen & Co., Wilkes-Barre, Pa.; secretary, Herman D. Moskowitz, M. Samuel & Sons, Brooklyn; treasurer, Thomas F. Kelly, Brooklyn.

The members of the executive committee, in addition to the officers, include: J. V. S. Bishop, Bishop & Co., Philadelphia; I. Wilkoff, Wilkoff Co., Youngstown; Morris Speer, Rotter-Speer Co., Cleveland; Phil Frieder, David J. Joseph Co., Youngstown; I. W. Solomon, Pittsburgh; Darwin Luntz, Luntz Iron & Steel Co., Canton, Ohio; Allen R. Hoffer, Allen R. Hoffer Co., Philadelphia.

The board of directors elected at the meeting consists of the officers, the members of the executive committee and the following: Israel Citron, Citron-Byer Co., Trenton, N. J.; Harry Ehrlich, Springfield, Mass.; Jack R. Forcheimer, St. Louis; David Strauss, Continental Iron & Steel Co., New York; Charles Dreifus, Charles Dreifus Co., Pittsburgh; Walter Erman, Erman-Howell Co., Chicago; W. J. Ross, Hyman-Michaels Co., Chicago; Charles Bock, M. Bock & Son, Buffalo; Alex Luria, Luria Brothers & Co., Reading, Pa.; B. P. Williams, Hickman, Williams & Co., St. Louis; Harry Roblin, Buffalo Housewrecking & Salvage Co., Buffalo.

### Plea for Cooperation

At the annual business meeting, a plea for cooperation between scrap dealers and consumers was made by Director-General Benjamin Schwartz in his annual report. Mr. Schwartz outlined a program of cooperation with both groups. In referring to the recent announcement by Charles M. Schwab, president of the American Iron and Steel Institute, that a committee of the board of directors of the steel institute would be appointed to meet with the committee of the scrap institute, Mr. Schwartz declared:

"There are fundamental rights and privileges involved in the relations between the scrap iron industry and the steel industry, and these will be presented to the proper forum. It is our sincere belief that in such matters as direct dealing the best interests of the steel industry are as much involved as the future of the scrap iron industry. It is submitted that the effects of direct dealing, as practised today, are to bring about an invasion of scrap markets that have been the sources of supply of local steel mills and to disrupt normal scrap markets; to induce the elements of discrimination and unfair competition among the steel mills, by the use of scrap as a leader to make sales; to jeopardize the investment of the scrap iron industry

and prevent it from rendering its recognized service to American industry and to national welfare.

"These are facts which we believe the leaders of the steel industry are beginning to realize. We have every confidence that the sincerity of the institute will burn through the sham of any special economic theory expounded by any mill for its special benefit, that the scrap iron dealer is unnecessary to the steel industry or that he does not render a necessary service."

### Urge Mergers in Industry

Mr. Schwartz also urged the need of mergers in the scrap iron industry and closer cooperation between brokers and dealers to eliminate the losses which the scrap iron industry has sustained as the result of a drive for volume of business, without regard to the rights of competitors and without regard to profits.

"Based on the leadership of the industry and recognizing the constructive forces that are at play today in the industry," declared Mr. Schwartz, "I presume to predict that the scrap iron industry will be on a materially different basis in five years than that on which it has operated in the past. Those who believe that profits can be made out of the ignorance of the trade or by the abuse of power will have to contend with these constructive forces; those who are prepared to adjust themselves to a progressive order will prosper."

The rest of this session was given over to reports of the officers of the institute, reports by the presidents of the 12 chapters and to an interesting speech by Prof. Spurgeon Bell, director of the Bureau of Business Research of Ohio State University, on "The Economics of the Scrap Iron Industry."

At a banquet Thursday evening, David A. Brown, chairman of the Broadway National Bank of New York, was the chief speaker. Other speakers were William Saltiel, city attorney of Chicago; Oscar E. Carlstrom, attorney general of Illinois, and Benjamin Schwartz.

### Code Violations Considered

Tuesday's schedule began with a meeting of the trade relations bureau. It was announced that the bureau had handled 23 cases involving violations of the code of business practice of the institute, 15 of which were filed by steel mills, six by institute members and 10 by non-members. Twelve of the complaints were for doctoring of cars, two for defamation of competi-

tors, one for interference of contract, two for commercial bribery, two for circularization of misleading quotations, two for willful failure to fill orders, one for willful overbilling of weights, and one for failure to give credit for overweight.

As a result two members had been expelled from the institute, and five letters of warning had been issued. The other complaints had been adjusted or were pending adjustment. The meeting recommended to the executive committee the appointment of a field man for the bureau to make investigations and inspections in connection with the enforcement of the code. It was also decided to give to each chapter a certain amount of autonomy over local affairs in an advisory capacity, the jurisdiction of complaints resting with the national trade relations committee.

#### Will Delay Freight Rate Case

At a luncheon meeting of the traffic committee, presided over by William M. Hilb, Cincinnati, chairman of the committee, it was the consensus of opinion that the institute take no steps at the present time toward prosecuting the case, authorized by the institute, attacking the freight rate structure on scrap iron and steel before the Interstate Commerce Commission, until final disposition is made of many scrap cases now before the commission, which involve principles that may affect the institute's traffic case.

A forum on insurance, with George B. Doane, Boston, presiding, was addressed by William H. Cameron, director of the National Safety Council. It was reported that the average compensation rate for the scrap iron industry in the 25 States in which the institute has members was \$10.69 per \$100 of payroll, ranging from \$5.25 in Pennsylvania to \$21 in New York. The meeting adopted three resolutions: that a safety educational campaign by the institute be prepared during the next year; that accident records be compiled from regular reports of the members as a basis for a study of the risks of the industry; and that an insurance actuary be retained by the institute to coordinate the entire program.

#### Research to Be Broadened

Wednesday opened with a meeting of the research committee. Alloy steel scrap and scrap specifications were the principal topics discussed. A resolution was adopted authorizing the committee to work out a program of cooperation with producers of scrap that will secure the proper sorting of scrap. The 12 chapters of the institute are to study the requirements of the steel mills and consumers in their districts, and to report back to the research committee their recommendations, after consultation with the consumers in their respective districts.

A second resolution authorized a survey of the scrap iron and steel handled by the scrap iron dealers through brokerage and through their

yards, as a supplement to the survey of consumption of scrap by steel mills and production of scrap by railroads, automobile companies and other producers, which is now being carried on by the institute. Another resolution authorized the committee to confer with the National Automobile Chamber of Commerce, to work out a plan to utilize the machinery and the organization of the scrap iron industry in the handling of the scrapped automobiles, under the proposed Highway Safety Plan of the chamber, which will seek to scrap 400,000 old automobiles. E. J. Howell, chairman of the committee, presided.

#### Cost of Preparing Scrap

A forum on costs and yard operations, at which Myron Cohen, Cleveland, presided, was addressed by B. P. Williams, Hickman, Williams Co., St. Louis, who gave the results of a cost survey which his company recently completed. The survey, reported Mr.

Williams, showed that it cost \$2.64 to handle and prepare a net ton of scrap in 1928. B. E. Jordan, a director of the National Association of Cost Accountants, spoke on the necessity of cost accounting in the scrap iron business. The forum on costs was attended by more than 200 dealers.

The meeting of the trade customs committee was marked by heated discussion on the proposals of the committee to codify certain trade customs and contractual obligations between brokers and dealers. The committee approved a recommendation that time was to be the essence of a scrap contract, that is, that a contract to deliver scrap within 30 days would terminate at the end of that period without further notice from either party, and that damages, if any, should be fixed as of the expiration date. The machinery for determining the damages would be the arbitration bureau of the institute. Phil Frieder, Youngstown, presided at this meeting.

## Aluminum in 1929

### Output Increased—Imports Larger and Exports Smaller—Two Chief Developments

NEW aluminum produced in the United States during 1929 amounted to 225,000,000 lb., valued at \$51,864,000, as compared with 210,000,000 lb., valued at \$47,899,000, produced in 1928, according to a statement of the United States Bureau of Mines. The principal producing plant was that at Massena, N. Y., where approximately 42 per cent of the metal made in the United States was produced. Other works are at Niagara Falls, N. Y.; Alcoa, Tenn., and Badin, N. C.

Imports of aluminum metal, scrap and alloy in 1929 were 28 per cent more in quantity than in 1928. Imports of plates, sheets, bars, etc., in 1929 decreased 16 per cent in quantity and imports of hollow ware were slightly less than in the previous year. Imports of "other manufactures" of aluminum increased 15 per cent in value in 1929, as compared with imports of similar products in 1928.

Exports of aluminum ingots, scrap and alloys in 1929 decreased 74 per cent in quantity. Exports of tubes, moldings, castings and other shapes increased 146 per cent, as compared with 1928, and exports of plates, sheets, bars, etc., increased 23 per cent. The value of table, kitchen and hospital utensils exported in 1929 increased 10 per cent, and that of "other aluminum manufactures" increased 14 per cent as compared with 1928.

According to the chairman of the board of the Aluminum Co. of America, Arthur W. Davis, the two most interesting developments in the aluminum industry during 1929 were the completion of a manufacturing tech-

nique that made possible the rolling of large structural shapes from high-strength alloys, and the adoption of aluminum as a new decorative and utility metal by architects.

Aluminum shingles, roofing and corrugated sheets, which are standard products of growing importance, have been joined in this field by ornamental castings for crestings, spandrels, cornices, finials and other metal accessories. Several recently constructed office buildings carry from 50 to 100 tons of aluminum, mainly in the form of cast spandrels or ornamental exterior wall plates and sills. In aviation, the average amount of aluminum per plane in 1929 increased greatly over preceding years. Other products of aluminum reflected in their volume the high-production scales of the fields to which they go, including the electric light and power, pigment for paint, cooking utensils, household machinery, furniture and chemical industries.

### New York Factory Earnings Rise in January

Average weekly earnings of shop and office employees in representative New York State factories were \$29.80 in January, according to the State Industrial Commissioner. This figure is the highest for any January in the history of these statistics, which date from 1914. The average compares with \$29.75 reported for December and \$29.71 for January, 1929. However, with the exception of these two months and November, 1929, there has been no lower month since November, 1928.

# New Method of Cold Roll Piling

## Tin Plate Mechanically Conveyed, Edged and Packed on Annealing Stands

A TIN plate piling apparatus which is substantially automatic in operation, having a number of separate devices performing the operations essential to piling the sheets as they pass continuously over the combined mechanisms, has been put on the market by the Wean Engineering Co., Warren, Ohio.

While the novel features of the machine have been worked out in connection with packing sheets of tin plate on annealing stands after cold rolling, the various devices comprising the unit are not limited to any particular application but may be used to advantage at other stages of the sheet manufacturing process where edging or piling is required.

The sheets on leaving the cold rolls are deposited on a belt-type runout conveyor. During the polishing operation, the runout conveyor is tilted into a vertical position permitting access to the rolls.

The runout conveyor carries the successive sheets to edging conveyor rolls, which, in turn, project each sheet horizontally into space above an edging conveyor. As the sheets projected from the edging conveyor rolls fall by gravity to the edging con-

veyor, the edger guides properly align them for introduction into the guides of a final piling layboy. This preliminary alining or edging of the sheet is an important feature of the piling machine, since it permits considerable latitude in the location in which the successive sheets may be fed into the first pass rolls by the rougher, without interfering with the final piling of the sheets.

From the edging conveyor, the sheets pass to an incline conveyor, located between the edging conveyor and the final piling rolls.

In operation, the discharge end of the incline conveyor moves upward or downward according to the elevation of the top of the pile of sheets on the stand. The proper location of the discharge end of the incline conveyor is effected by a hydraulically operated cylinder, the upper end of which carries the incline conveyor discharge pulley and piling rolls. The movement of the cylinder is automatically controlled by the height of the top sheets of the pile through an electrical inching switch, which starts and stops the hydraulic pump motor.

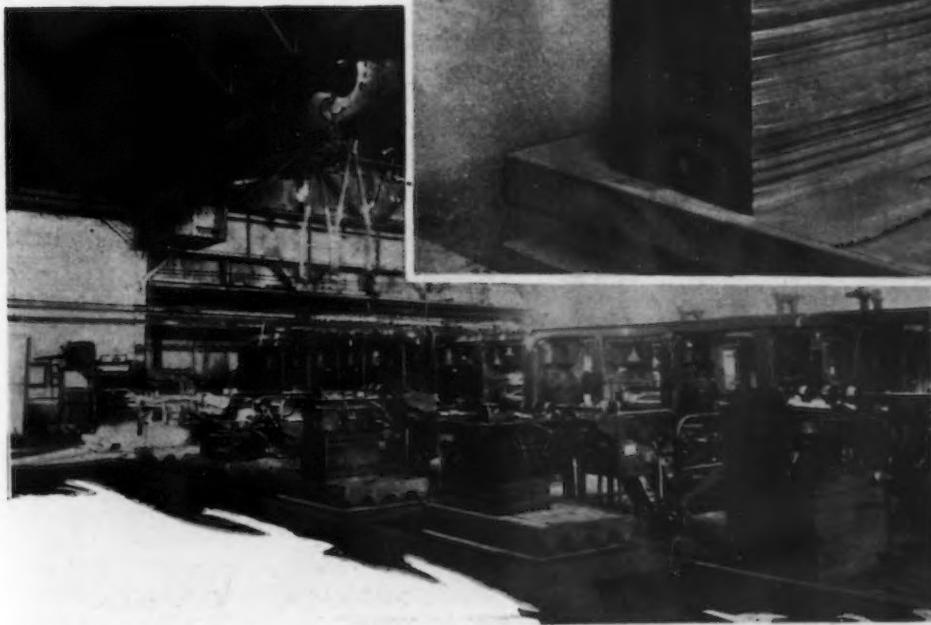
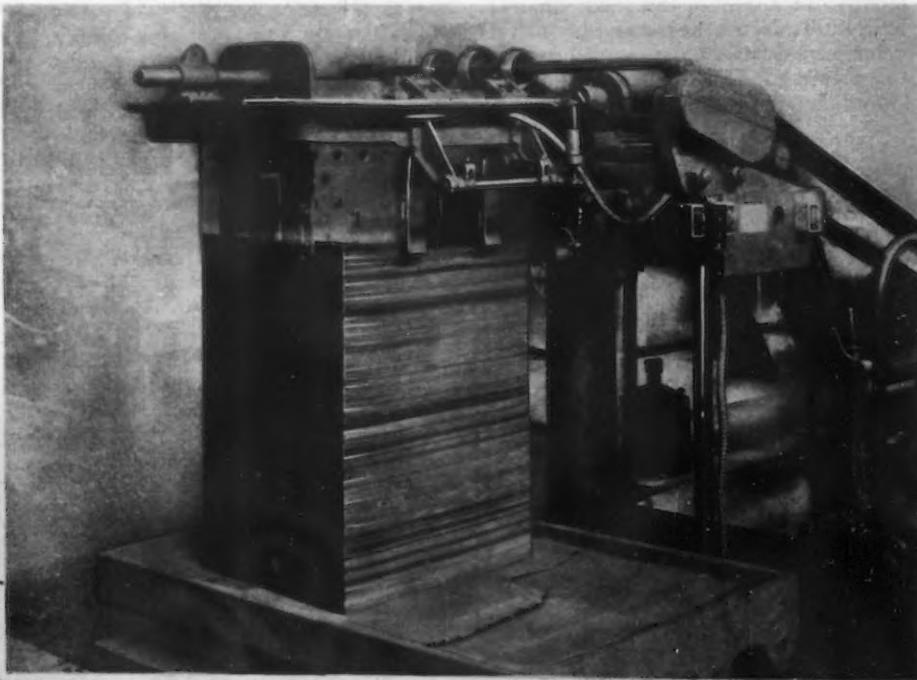
From the incline conveyor the sheets pass to the piling rolls and are pro-

jected horizontally into space directly above the previously piled sheets. The forward momentum of the sheets is arrested by an adjustable backstop, after which the sheets settle by gravity to the top of the previously piled sheets. While the sheets are settling to the top of the pile, fingers positioned on two sides of the piling layboy edge the sheets into a right-angle corner formed by the opposite fixed guides of the layboy; in this way, practically perfect piling, free from protruding sheets or packs, is accomplished.

The piling layboy, as well as the preliminary edging guides, can be quickly adjusted to accommodate various sizes by means of screws and nuts. A change in the sizes being rolled should not cause a rolling delay of more than 1 min., while the adjustments are being made.

The sheets are piled on an annealing stand, which has been placed on a transfer car by overhead traveling crane. The transfer car, with the annealing stand, is properly spotted under the piling layboy by power provided by hydraulic elevating pump through suitable control valves. Then the piling machine is lowered to the stand. The machine operates automatically until the pile of sheets reaches the proper height (about 40 in.), at which time an operator is again required to relocate the car and stand for a second pile of sheets, this requiring about 30 sec. After

**S**HEETS Are Fed to the Top of the Pile by an Incline Conveyor, Which Is Raised by a Hydraulically Operated Cylinder. The movement of the cylinder is automatically controlled by the height of the top sheets of the pile through an electrical inching switch



A BATTERY of Pilers, with Cold Rolls in Background, Is Shown at Left

the second pile of sheets is completed, the overhead crane removes the loaded annealing stand and replaces it with an empty stand, completing the cycle.

With the mechanical equipment described, protruding edges, common in hand packing and causing burned edges in white annealing, are eliminated. The straight sides of the piles produced by the machine permit covering and uncovering the stands with less danger of bent corners than is possible with irregular handpacking. The edging eliminates nicked edges in transferring the cases between the pins of the white pickling crate. Scratches and damaged edges made by the hand packer in sliding the sheets

along the packer's bench and up-ending the case for edging are avoided.

All of these factors combine materially to reduce the seconds produced in processing tin plate.

One machine is required for each cold mill; however, one operator can supervise three to six machines, depending on local conditions, and can perform the same work handled by three to six packers.

Time lost in changing sizes and delays incident to changing pots are negligible—probably 10 min. per turn. This slight loss in production is more than offset, particularly in the summer months, by the elimination of fatigue.

specifications are: Floor space required, 68 x 168 in.; driving motor, constant-speed, 60-hp.; and shipping weight, 58,300 lb. The ram is a hollow bored forging of the plugless type and slides in guide which has been made as long as possible to assure rigidity of the blow. The base plate is a one-piece casting and is secured to cylinder frame or housing by means of four weldless rings shrunk on machined bosses forming a part of the housing and base. The anvil block, made of a special mixture of gray iron, is separate from hammer base, resting independently on the foundation. It weighs 21,000 lb. The diagonal forging position renders the dies accessible on all sides and enables long bars to be worked in either direction across the anvil, clearing the hammer frame. Exhaust is into the hammer frame. Automatic force-feed lubrication is provided.

### Shear-Type Scrap Cutter for Bliss Presses

A NEW type scrap cutter, shown on the Bliss 645 press illustrated herewith, is being used on all high-production presses made by E. W. Bliss Co., Brooklyn, N. Y. Its mechanism and adjustments are patterned after those of the company's squaring shears. The shear slide is driven from an eccentric on the extended crankshaft of the press, through a standard ball joint connection.

The eccentric is mounted so that the scrap cutter is timed 30 deg. behind the press slide, providing ample time for proper location of the strip by the pilots, before the shear blades lock it. It is not necessary to make delicate adjustments to synchronize the press slide and the scrap shear.

Regular press gibbing is used for

the shear slide and take-up screws are provided to maintain a tight sliding fit. The upper shear blade is mounted in an adjustable holder. The holder, which is similar in function to the table of a squaring shear, can be finely adjusted to get small clearances necessary for cutting thin stock. Stock is held down against the lower blade by a plate backed by springs. For shearing hard silicon steel such as required for radio, motor and power transformer laminations, shear blades of Neor steel are furnished.

### New Self-Contained Heavy-Duty Air Hammers

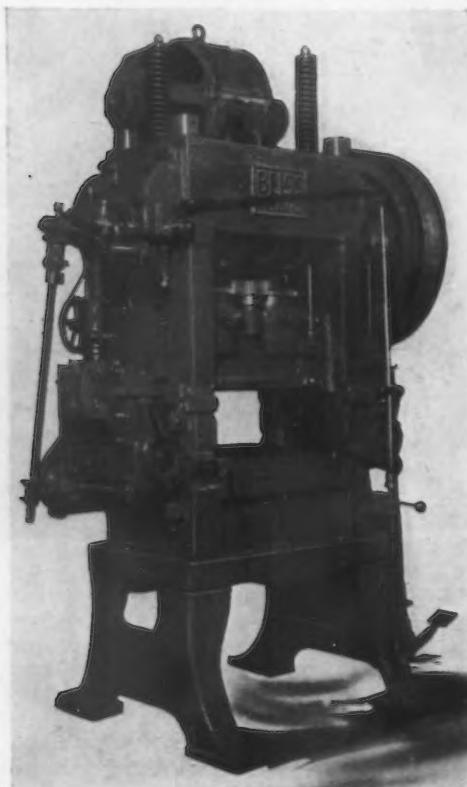
MILD steel up to 10 in. square may be worked by the heavy-duty hammer illustrated, which has been added to the line of self-contained motor-driven air hammers built by the Nazel Engineering & Machine Works, Philadelphia.

The ram of this machine, which is designated as the No. 7 type B, has a 32-in. stroke. The distance from the center of ram to the housing is 30 in. Other

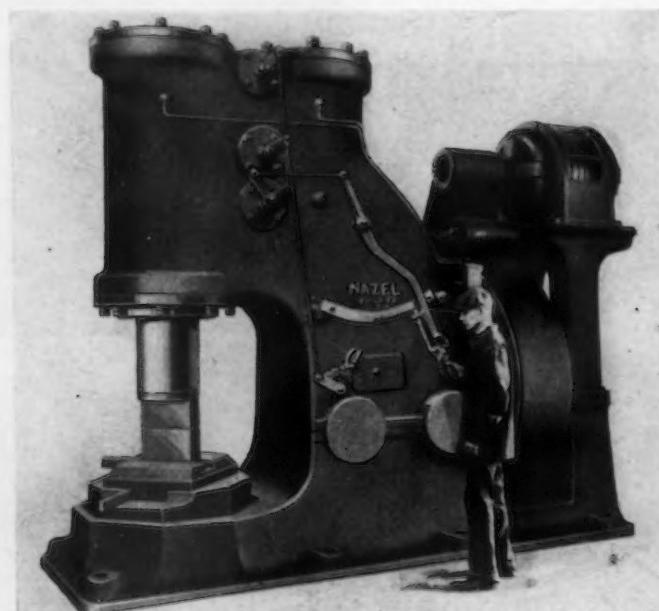
### Baldwin and Duckworth Chain Companies Merge

Stockholders of the Baldwin Chain & Mfg. Co., Worcester, Mass., last week approved a merger of that company with the Duckworth Chain & Mfg. Co., Springfield, Mass. Stockholders of the latter company previously approved the merger. The combined assets of these companies is approximately \$2,000,000. It is proposed to operate the two plants as units of the new company. Details as to the name of the new combine, capitalization and personnel will be announced later.

Orders for steel boilers in January totaled 942 units, with 1,081,764 sq. ft. of heating surface, against 1029, with 880,172 sq. ft., in December, according to reports received by the Department of Commerce from 81 manufacturers comprising most of the leading firms in the industry.



Delicate Adjustments to Synchronize the Press Slide and Scrap Shear Are Unnecessary



The Ram Has a 32-In. Stroke. Mild steel up to 10-in. square may be worked

## Two New Radial Drills

One Machine Features V-Disk Transmission in the Head; the Other Has Hydraulic Feed, Head Traverse and Arm Clamping

TWO radial drills, one designated as the Gen-Rad and the other as the Hy-Rad, have been placed on the market by the General Radial Drill Co., Cincinnati. In the former the spindle is driven by a motor on the head through Gibbs V-disk transmission, eliminating speed change gears. A feature of the Hy-Rad radial is the hydraulic arrangement for feeding the spindle, traversing the head on the arm and clamping the arm to the column.

The Gen-Rad is a general-purpose machine with capacity for twist drills up to 2 in. in diameter. It is built in two sizes, with column diameters of 9 and 11 in. and with a 3 or 4 ft. arm. The electric power intake is to the base of the column.

Brushes in contact with the rings of a revolving connection at the base are wired through an iron conduit secured to the cap at the top of the column. The connection with the power line is thus maintained as the cap at the top of the column swings with the arm.

An electric motor at the top of the column raises and lowers the arm through a worm drive. A second motor, on top of the head, drives the spindle and the feed mechanism. The worm-wheel on the column motor is engaged by a positive clutch keyed to the elevating screw. Should downward movement be blocked, the arm is stopped but the screw continues to revolve, lifting the clutch out of engagement with the worm-wheel and disconnecting the power.

The column consists of an inner and an outer tube cast integral with web

connections. The inner tube provides space for the electric wiring. The barrel on the arm is not split; it completely surrounds a sleeve which is a slip fit on the column. Ball bearings at the top and bottom of this sleeve facilitate rotation of the arm and barrel around the sleeve and column. Split rings keyed to the top and bottom of the barrel, at its point of junction with the arm, clamp the arm. The bolts which hold the clamping rings in place on the barrel are a clearance fit, allowing sufficient movement for the manually operated clamps shown at A in Fig. 1 to bind these split rings accurately to the column.

### Speed and Feed Change Mechanisms

From the motor on top of the head power is transmitted to the patented Gibbs V-disk transmission illustrated in Fig. 3. A disk mounted on the motor spindle engages the lower disk A. By changing the position of the idler between the two sheaves, any of 12 speeds can be obtained; and by changing the diameters of the steps in the two sheaves, provision may be made for arranging these 12 speeds in groups covering ranges from 78 to 3000 r.p.m. The starwheel shown at B in Fig. 1 is mounted on a short shaft shown at B in Fig. 3. By pulling this starwheel forward, the idler is drawn out of engagement with the sheaves and by turning the starwheel to bring the arrow into position on the graduated dial for the required speed, the idler will engage the required steps on the sheave when the starwheel is pushed back. An index

pin locks the starwheel and the idler disk in the desired position.

From the driven sheave power is transmitted through bevel gears between which there is a clutch operated by lever C in Fig. 1. This provides reversing movement for tapping. Power is carried to the feed mechanism through a pair of gears. Sliding gears provide seven changes of feed, ranging from 0.006 in. to 0.037 in. per revolution of the spindle. The power feed is engaged through lever E in Fig. 3. For sensitive drilling operations this clutch may be disengaged and the spindle fed by hand through lever F. The drill is advanced to the work with the hand wheel G. Rapid adjustments of the spindle position are accomplished by hand levers carried on the shaft H.

Traversing the head on the arm is accomplished by a rack and pinion operated by a hand wheel shown at I in both Figs. 1 and 3. Push-button controls on the head govern the action of both electric motors on the machine. All controls are centralized on the head within easy reach of the operator.

### Hy-Rad Hydraulically Operated Radial Drill

The Hy-Rad machine, Fig. 2, is equipped for feeding the spindle, traversing the head on the arm and for clamping the arm to the column by means of hydraulic pressure. It is built in column diameters of 15, 17 and 19 in., with arms from 4 to 8 ft. long. Connection with the electric power line, construction of the column, provision for raising and lowering the arm and design of the barrel and provision for clamping are the same as in the Gen-Rad except that clamping the arm to the column is accomplished hydraulically. Hydraulic spindle feed is emphasized as providing greater uniformity of feeding

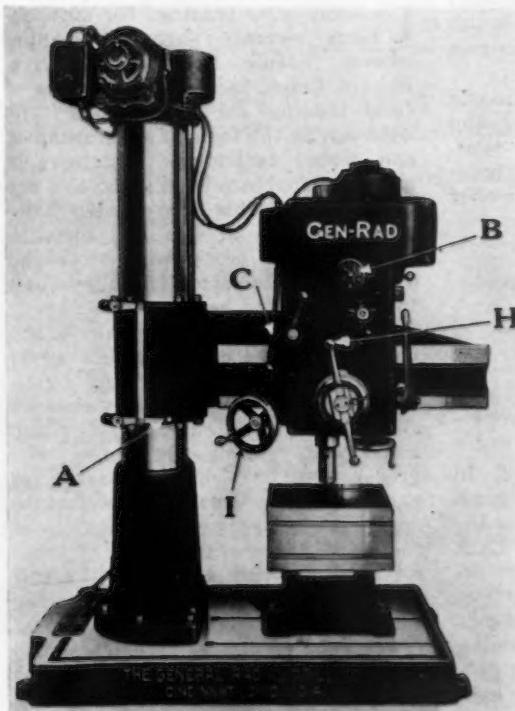
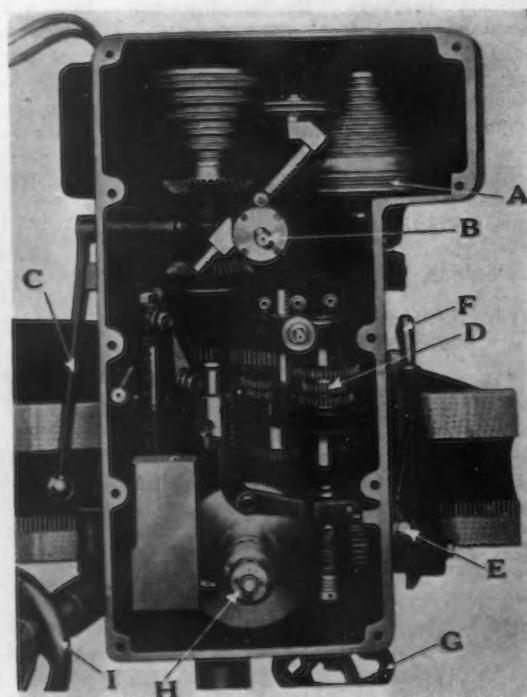


FIG. 1 (at Left). General Purpose Radial Drill, Using V-disk Transmission Drive

DETAIL of Fig. 2 (at Right). Gibbs Patent V-disk Transmission Which Drives the Spindle of the Gen-Rad Radial



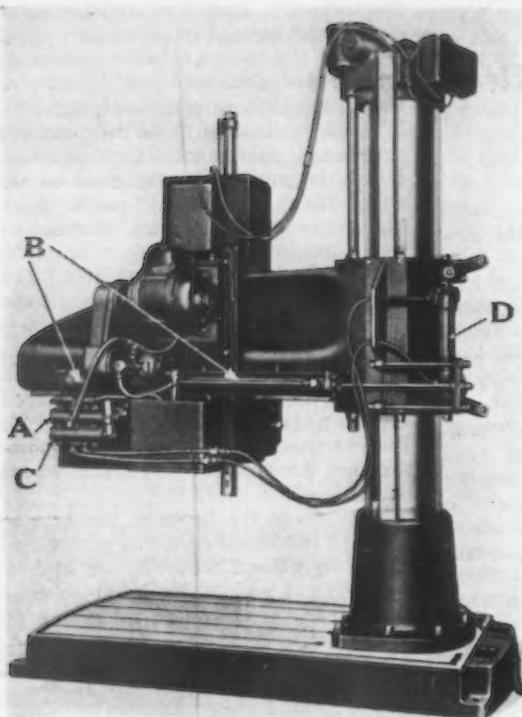
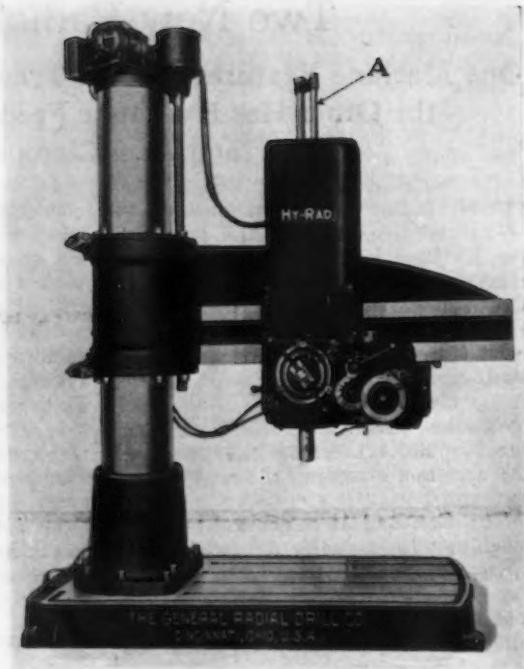


FIG. 2. Front and Rear Views of Hy-Rad Radial Drill. Spindle feed, head traverse and arm clamping mechanisms are hydraulic



movement and greater flexibility and control of feeds. An unlimited range of feeds is available and the feeds can be quickly adjusted to compensate for variations in the hardness of material being drilled.

An electric motor mounted at the back of the drilling head (shown in Fig. 2) drives both the hydraulic pressure pump and speed change gears. Twenty-four changes of speed are obtained. They are indicated by a direct reading dial on the head. On the machine illustrated the range of spindle speeds is from 20 to 1058 r.p.m. Other ranges of speed can be furnished as required.

The piston for hydraulically feeding the spindle is mounted directly at the top of the spindle. It rotates on anti-friction bearings. By moving the lever at the bottom of the drilling head to the left pressure is applied for feeding the spindle downward; moving it to the right causes the spindle to move upward. The rate of feed is regulated by a starwheel and indicator needle running over a graduated dial on the head. Feeds ranging from 0 to 100 in. per min. are available. Means are provided for moving the spindle up or down by hand.

#### Hydraulic Traversing of the Head and Clamping of the Arm

The valve *A*, Fig. 2, admits pressure in either direction in cylinder *B* to provide for traversing the head on the arm. This traverse is controlled by a lever mounted on the front of the head above the starwheel. Moving it to the left or right of a middle (neutral) position gives the direction of traverse. Speed of traverse of the arm is controlled by the amount the valve is opened. Rapid or very slow movement can be obtained.

Two push-button controls are mounted at the lower left-hand corner

of the operating side of the head. One of these governs the electric motor at the top of column for raising and lowering the arm, and the other controls the electric motor which drives the hydraulic pump and spindle transmission gears. Thus, all control mechanism is centrally located on the head.

#### General Purpose Blowpipe of Light Weight

**A**BOUT a year ago Oxfeld Acetylene Co., New York, introduced into the aircraft industry a special blowpipe for welding light gage tubing. This has proved so popular that a full-sized blowpipe of similar design, known as type W-17, has now been put into production.

Tip and welding head are in one piece, being combined in a long and slender stem of the goose-neck type. Since acetylene is used at low pressure, the injector and mixing chamber



The Long, Thin Welding Heads Facilitate Welding in Inaccessible Places

have been given special attention. In each of the ten welding heads of graduated size the injector is located at the base or handle end of the stem. Each welding head has its own nut for attaching it to the handle of the blowpipe, so constructed that it extends beyond the injector when the welding head is detached, thus serving to protect the injector from careless handling. A fine pitch thread makes it

possible to tighten or loosen the nut without the use of a wrench.

The handle of this new blowpipe is made of a special brass tubing having longitudinal ribs, offering a sure grip to the operator and also reinforcing the handle.

The type W-17 blowpipe is compact and light. With the No. 4 welding head it weighs but 24 oz. According to the makers the long thin shape of the welding heads adapts this blowpipe for places inaccessible to almost any other type of equipment.

#### Sealed Ball Bearings of Small Dimension

**I**N addition to bearings for such obvious aircraft parts as landing wheels, Fafnir Bearing Co., New Britain, Conn., has developed a line of small bearings for the controls. The latter are in the form of self-contained and sealed cartridges, containing a single or double row of balls, and are especially suitable for exposed locations, such as aileron and elevator hinges, rudder posts, wing slots and flaps, the larger sizes of pulleys and to push-pull rod bearings.

According to the company's announcement, the cartridge unit offers the best possible seal for any condition of exposure. The felt seal is an efficient means of excluding dirt and water and retaining lubricant. The grease with which the units are packed at the time of manufacture does not need renewal for the life of the plane. In general, the use of properly designed ball bearings will result in easier and more uniform operating controls, less attention for greasing, fewer repairs and replacements, and the elimination of the danger of jammed or "frozen" controls during flight.

# Slowing in European Demand for Steel

Pig Iron Is Dull, Also—Cartels Are Active on Continent, But Exports Fail to Respond—Large Engineering Work in Prospect

(By Cable)

LONDON, ENGLAND, March 10.

**P**IG IRON is dull with consumers not considering forward contracts, as they expect lower prices. Furnace stocks are accumulating, particularly in hematite iron. Coke is cheaper, but Cleveland furnaces are maintaining their prices.

Finished steel is generally quiet in export markets and home demand for plates and shapes is slowing down as a result of decreased shipyard requirements. Building construction and engineering markets, however, are well engaged.

Tin plate is quiet, consumers being influenced by the erratic tin market. Inquiry is good, but sales are only moderate, as most mills are in a sound position.

Galvanized sheet prices have steadied as a result of the price agreement by mills, but a substantial demand is lacking, although sales have improved. Black sheets are quiet.

Clyde output in February was 12 vessels of 47,000 tons. Thomas W. Ward has acquired the Denby Coal & Iron Co., comprising 4 blast furnaces, a colliery and brick works.

The committee appointed to investigate the question of transportation across the Humber River proposes the building of a bridge at a cost of £2,000,000 (\$9,732,000) for a vehicle roadway only, or £4,000,000 (\$19,464,000) if it is a combined vehicle and

railroad bridge. The total length of the bridge would be 3½ miles and construction would require five years.

Tenders on two alternative plans for the new Nile bridge at Cairo range in Egyptian pounds from £213,000 and £250,000 bid by Dorman, Long & Co. to £510,000 and £594,000 bid by the Motherwell Bridge Co. The Friedrich Krupp A. G. quoted £330,000 and £406,000.

Exclusion from the production quota of coal supplied to the British iron and steel trade, provided for in a clause in the Coal Mines Bill, received a negative vote in the House of Commons. In debate, Mr. Skelton stated that under this bill coal would be increased 1s. 6d. (36c.) per ton, which would involve an advance of

4s. 6d. (\$1.09) a ton in steel costs.

Continental sales of steel to British consumers have been limited, as buyers and sellers generally are awaiting the final selling arrangements by the International Steel Cartel.

The Continental Hoop Cartel has been renewed and will operate from March 15 with a fixed minimum price of £5 17s. 6d. per ton (1.28c. per lb.), base, f.o.b. works port.

The Western European Pig Iron Cartel has suspended control of sales to Italy and Switzerland with the result that foundry iron is somewhat disorganized.

The Continental Wire Rod Cartel has increased the production quota for second quarter to 500,000 tons.

## British Rationalization Progresses

Further Integration and Organization to Cultivate Foreign and Domestic Business Feature Movement

LONDON, ENGLAND, Feb. 26.—Indications of still closer and more effective organization of the steel industry of the Northeast Coast and associated national effort to widen the use of steel at home and abroad are features of a rationalization program that has been undertaken in earnest.

Substantial economies in production are expected in the coming year as a result of the merger of Dorman, Long & Co., Ltd., and Bolckow, Vaughan & Co., Ltd. This consolidation is negotiating for a working agreement with the Furness group of mills. The area in which these plants are located is bounded by the Tees and Tyne rivers and forms a compact geographical district that produces about one-third of the total British output of pig iron and one-fourth of the country's steel.

To cultivate foreign trade the Brit-

## British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

### British Prices f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3 12 1/2s.	to £3 13 1/2s.	\$17.64	to	\$17.88
East Coast hematite	3 17 1/2	to 3 18	18.86	to	18.98
Ferromanganese, export	12 5	to 12 10	59.61	to	60.83
Billets, open-hearth	6 2 1/2	to 6 12 1/2	29.81	to	32.24
Sheet bars, open-hearth	5 17 1/2	to 6 5	28.59	to	30.42
Black sheets, Japanese specifications	12 5		59.61		
Tin plate, per base box	0 18 1/4	to 0 18 1/2	4.43	to	4.55
Rails, 60 lb. and heavier	7 15	to 8 15	37.72	to	42.58
Steel bars, open-hearth	8 0	to 8 10	1.74	to	1.85
Beams, open-hearth	7 7 1/2	to 7 17 1/2	1.60	to	1.71
Channels, open-hearth	7 12 1/2	to 8 12 1/2	1.66	to	1.87
Angles, open-hearth	7 7 1/2	to 7 17 1/2	1.60	to	1.71
Ship plates, open-hearth	7 15	to 8 5	1.68	to	1.79
Black sheets, No. 24 gage	9 15	to 10 0	2.12	to	2.17
Galvanized sheets, No. 24 gage	11 17 1/2	to 12 5	2.57	to	2.60

Sheet bars, Thomas	4 13	to 4 15	22.63	to	23.12
Wire rods, low C., No. 5 B.W.G.	6 2	to 6 4	29.69	to	30.19
Rails, 60 lb. and heavier	6 8 1/2	to 6 10*	31.27	to	31.63
Rails, light	6 0		29.20		
Steel bars, merchant	5 7 1/2		Cents a Lb.		
Steel bars, deformed	5 6 1/2	to 5 7 1/2	1.17	to	1.18
Beams, Thomas, British standard	5 3	to 5 6	1.12	to	1.17
Channels, Thomas	5 12	to 5 14	1.24	to	1.26
American sections	5 6		1.17		
Angles, Thomas, 4-in. and larger, over ¾-in. thick	5 7 1/2		1.18		
Angles, Thomas, 3-in.	5 6				
Ship plates, open-hearth inspected	7 3	to 7 5	1.56	to	1.60
Black sheets, No. 31 gage, Japanese	12 2	to 12 3	2.67	to	2.68
Hoop and strip steel over 6-in. base	5 17 1/2		1.28		
Wire, plain, No. 8 gage	6 10		1.42		
Wire, galvanized, No. 8 gage	8 5		1.79		
Wire, barbed, 4-pt. No. 12 B.W.G.	10 17 1/2		2.36		
Wire nails, base	6 15		\$1.47 a keg		
Wire nails, assortments 1 to 6-in. keg	10 5		2.22		

\*Open-hearth steel, 8s. (\$1.95) a ton extra.

### Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 6s.	to £3 10 1/2s.	\$16.06	to	\$17.15
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 1	to 3 2	14.84	to	15.08
Billets, Thomas	4 13	to 4 14	22.63	to	22.87

ish Steel Export Association was formed by the Heavy Steelmakers' Association and the British Steelwork Association. The work of the association is still in its early stages, but most steel producers consider that it has already justified its existence and that there is every prospect that British competition abroad will be more effective in the future. Orders obtained by the association are allocated to members on a percentage basis. The possibilities of increased business in Canada and South America have been investigated by representatives of the association.

The British Steelwork Association is also a new organization, having been formed toward the end of last year to promote a wider use of steel. As a beginning it was decided to con-

centrate on extending the use of steel for building purposes by securing modification of certain obsolete building legislation. The association is now cooperating with the Department of Scientific and Industrial Research of the Board of Trade in an investigation of current building regulations, which, it is believed, will provide a basis for a uniform building code.

The activities of these two associations indicate the extent of efforts by the British steel industry to regain its former prosperity. At present a Government inquiry into the condition of the industry is in progress, but material assistance is not expected and there is a tendency to concentrate on the work of the organizations that the industry has established to help itself.

ser, American consul at Cardiff, Wales.

The leading market in 1929 was Australia, which took 57,109 tons, while the Netherlands ranked second, taking 43,620 tons. Italy received 33,157 tons; Japan, 31,652 tons; China, 28,922 tons, and the United States, 286 tons. The British possessions of Australia, Canada, Straits Settlements and India took a total of 134,618 tons.

## Lithium Increasingly Used as an Alloy

HAMBURG, GERMANY, Feb. 24.—The use of lithium as an alloy is rapidly increasing in Germany. Producers of aluminum alloys are including 0.1 to 0.15 per cent of lithium, which results in a considerable increase in hardness. Prior to the war lithium was sold at 3000 m. per kg., but the present quotation is 140 m. (\$33.46) per kg. (\$15.18 a lb.). Production of lithium in 1929 was 40 times greater than in 1922. Recently experiments have been made in alloying steel with lithium, but the results have not been made public.

## Welsh-German Tin Plate Agreement Proposed

HAMBURG, GERMANY, Feb. 24.—The Welsh tin plate producers are negotiating with the Vereinigte Stahlwerke A. G., Düsseldorf, which controls the German output of tin plate, in an effort to conclude an agreement regulating prices and exports. Germany ships 3000 to 3500 tons of tin plate a month to other European countries, but does not export to overseas markets. It is understood that the proposed agreement would affect the Norwegian, Portuguese, Dutch and Italian markets.

## Austrian Beryllium to Be Sold Through New York

HAMBURG, GERMANY, Feb. 24.—The large beryllium deposits near Graz, Austria, which are now being developed by American, German and Austrian capital, will sell beryllium exclusively through the Beryllium Corporation of New York. It is understood that the New York company will establish agents in other cities of the United States and in Germany.

## South African Steel Plant Cost Underestimated

LONDON, ENGLAND, Feb. 26.—Although no official statement has been made, it is understood that the steel plant to be built by the Union of South Africa will cost twice as much as was anticipated. The cost was originally estimated at £3,000,000, but it is now believed that the actual investment will be nearer £6,000,000 (\$29,200,000).

## Germany Uses More Steel Ties

### Railroads Plan to Replace 3500 Kilometers This Year—Country Is Already Largest User in Europe

DÜSSELDORF, GERMANY, Feb. 21.—The German State Railroads have a greater mileage of track laid on steel ties than the lines of any other Continental country, although progress in replacing wooden ties with steel was retarded in the years immediately following the Armistice. Under the present program of expansion, however, a considerable increase in the number of steel ties in Germany is expected.

On Dec. 31, 1929, the German State Railroads controlled 77,479 km. (48,143 miles) of track. Of this total 29,886 km. (18,570 miles) was equipped with steel ties and 47,593 km. (29,573 miles) with wooden ties. At present there are about 7600 km. (4722 miles) of track in need of new ties, but financial conditions, caused in part by the necessity of making large payments (600,000,000 m. in 1928) to the Reparations Commission, will prevent complete replacement this year. Not more than 3500 km. (2175 miles) of track will be reequipped with steel ties this year.

The present German production of steel ties is slightly in excess of 300,000 tons annually, of which only a small part is exported. The average weight of the steel ties used by the German railroads is 78 kg. (172 lb.). Germany is by far the largest European user of steel ties. They are employed to a limited extent in Austria and Czechoslovakia and represent only a small percentage of the ties in use in France and Great Britain.

## Cartel Places Exporters in Three Groups

HAMBURG, GERMANY, Feb. 24.—European exporters of steel have been classified by the International Steel Cartel in three groups. Class A exporters, who buy not less than 50,000 tons of steel annually, will receive a discount of 2s. to 2s. 6d. (48c. to 60c.) per ton; Class B exporters, who buy

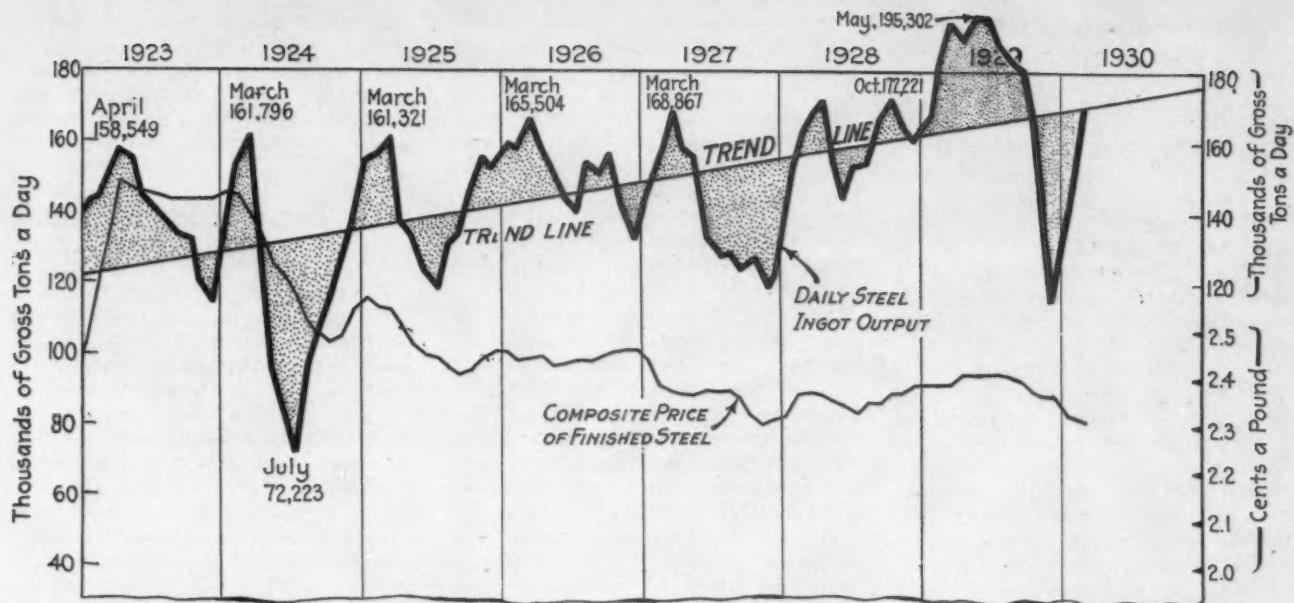
## German Nirosta Tube Output Increases

ESSEN, GERMANY, Feb. 24.—Production of Nirosta steel tubes is increasing rapidly in Germany. The Mannesmann Tube Works made 15,000 tons of the high chrome-nickel alloy tubes in 1929 and the German output of this tubing in 1930 is estimated at 25,000 tons. Breweries and chemical works are among the leading users of the alloy tubes.

The contract for chrome-nickel alloy steel plates recently reported placed with a Swedish maker for the Assouan Dam in Egypt is understood here to call for 1700 tons. The price is said to have been £100 a ton. Although the business was placed with the Avesta A. B., Stockholm, Sweden, it is believed that part of the order will be executed by the Friedrich Krupp A. G.

## Welsh Tin Plate Exports Increased in 1929

WASHINGTON, March 11.—Exports of tin plate and tinned sheets from South Wales and Monmouthshire in 1929 totaled 579,778 gross tons, valued at \$56,127,464, compared with 532,429 tons, valued at \$50,948,468, in 1928 and 472,016 tons, valued at \$48,766,235, in 1927, according to a report received from Ralph C. Bus-



Ingot Output in February Brought Production Up to the Level of So-called Theoretical Needs. The rebound in three months from December, 1923, was 41 per cent, the rebound in three months from December, 1926, was 25 per cent, while in the two months since December, 1929, the rebound has been 46 per cent

## Large Gain in Steel Ingot Output

February Daily Production Nearly 21 Per Cent Higher Than January—About 6 Per Cent Under February, 1929

THERE was an increase of over 281,500 gross tons in the February steel ingot output over January, despite three fewer working days. For the 24 days in February the production, calculated by the American Iron and Steel Institute, was 4,067,971 tons, against 3,786,450 tons (revised) for the 27 days in January. The February output was only 258,000 tons, or about 6 per cent, less than February a year ago, which was the largest output for that month on record.

Comparing daily outputs, the February rate, at 169,499 tons, was nearly 21 per cent larger than the 140,239

tons a day for January. The most recent lower daily average was 167,098 tons, last October, when the recession in output began to appear.

There were increases in both open-hearth and Bessemer outputs. The February reported open-hearth production, at 3,336,021 tons, was about 6.25 per cent larger than the 3,137,002 tons for January. Bessemer ingots, at 508,618 tons, showed a gain of about 15 per cent over January.

Electric and crucible ingots are not included in these totals, the production of which in 1928 averaged about 1480 tons a day. Some such figure would

have to be added to the daily output to obtain the total ingot production in the United States.

In the diagram is traced the course of ingot production and of finished steel prices since the beginning of 1923. The table gives the monthly output, as reported by the institute, for the past 14 months.

### Non-Ferrous Ingot Prices for February

CHICAGO, March 11.—The Non-Ferrous Ingot Metal Institute reports the average prices per pound received by its membership on commercial grades of the six principal mixtures of ingot brass during the 28-day period ended Feb. 28.

As there are, as yet, no generally accepted specifications for ingot brass, it must be understood that each item listed below is a compilation representing numerous sales of metal known to the trade by the designation shown, but each item, in reality, including many variations in formulas. Until the program of standardizing the principal specifications, now progressing in cooperation with the American Society for Testing Materials, is completed, the following specifications will be understood to refer to "commercial grades":

	Cents
Commercial 80-10-10 (1 per cent impurities)	16.504
Commercial 78 per cent metal	14.754
Commercial 81 per cent metal	15.004
Commercial 83 per cent metal	15.304
Commercial 85-5-5-5	15.539
Commercial No. 1 yellow brass ingot	12.287

### PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS (GROSS TONS)

Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Output of All Companies		No. of Working Days	Percentage Operation
	Open-Hearth	Bessemer	Monthly	Daily		
Total, 1928..	40,538,657	6,591,217	49,865,185	160,338	311	85.05
1929						
January .....	3,694,218	549,616	4,490,354	166,309	27	84.80
February .....	3,599,224	489,279	4,326,000	180,250	24	91.91
March .....	4,183,869	596,691	5,058,258	194,548	26	99.20
April .....	4,026,576	640,351	4,938,025	189,924	26	96.84
May .....	4,276,186	707,484	5,273,167	195,302	27	99.59
June .....	3,990,798	622,585	4,881,370	195,255	25	99.56
July .....	3,922,532	649,950	4,838,093	186,080	26	94.88
August .....	3,988,729	668,023	4,927,258	182,491	27	93.05
September .....	3,627,639	635,593	4,510,879	180,435	25	92.01
October .....	3,619,432	644,528	4,511,650	167,098	27	85.21
November .....	2,797,488	522,672	3,513,025	135,116	26	68.90
December .....	2,376,775	360,489	2,896,269	115,851	25	59.07
Total, 1929..	44,103,466	7,087,261	54,164,348	174,162	311	88.81
1930						
January .....	3,137,002	441,572	3,786,450	140,239	27	71.51
February .....	3,336,021	508,618	4,067,971	169,499	24	86.43
2 mos.....	6,473,023	950,190	7,854,421	154,008	51	78.54

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Of the 52 foundries represented 31 expressed the opinion that business is improving, and 21 reported business fair.

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## Use of Oil, Gas, Electricity Gains at Expense of Coal

Keen competition between the different modern sources of fuel and power is reflected in an analysis of world energy production for the 15-year period 1913-1928, made by the National Industrial Conference Board, New York. The production of crude oil and of hydroelectric power increased 243 and 162 per cent, respectively, and that of natural gas by 133 per cent. Coal is still by far the most important source of energy, but 1928 world output was only 5 per cent greater than that in 1913, world coal consumption having become practically stationary during recent years.

Depression of the industry in the older coal mining areas during post-war years has been due not to any one but to four major causes: (1) the increased output of useful energy per ton of coal; (2) increased coal production in new mining areas both in Europe and the United States; (3) rapid expansion in the production and consumption of oil and natural gas, and (4) the growing development of hydroelectric power.

# Drastic Price Changes Are Not Likely

BY LEWIS H. HANEY

Director, New York University Bureau of Business Research

**P**ROBABLY the outstanding fact concerning the general business situation is the continued recession of the general level of commodity prices. The decline has been so broad and persistent, and has carried the average price so low, that it cannot be dismissed as being of minor importance.

In the first place, the causes of declines are significant. These must be found in widespread overproduction and in the relative scarcity of gold.

## Overproduction Must Be Widespread

Overproduction of commodities is apparent in a dozen basic products—overproduction in the sense that supplies cannot be sold at a profit to the holders thereof. Silver, zinc, rubber, oil, sugar, coffee, automobiles, radios, silk, and possibly cotton and wheat, at once come to mind. In not a few cases the overproduction is due to the inability of the consumer demand to absorb the supply of finished products at previously prevailing prices. This is true, for example, of gasoline, silk hosiery, refined sugar, and residential building.

Once started, such a broad decline in prices operates in a vicious circle, for unemployment results and serves further to reduce consumption, and buyers are prone to postpone purchases just because prices are declining. Moreover, price declines in one raw material are likely to affect more than one finished product, and several products may be affected by the price of a given substitute product. Thus the movement spreads and gains momentum.

## Relative Scarcity of Gold

As to gold, the situation has doubtless been affected by the eagerness with which various nations have sought to build up their gold reserves, thus increasing the value of the precious metal, and tending to reduce the general price level.

Among the broader effects of declining commodity prices we may mention the following: (1) a tendency to withhold orders and buy from hand-to-

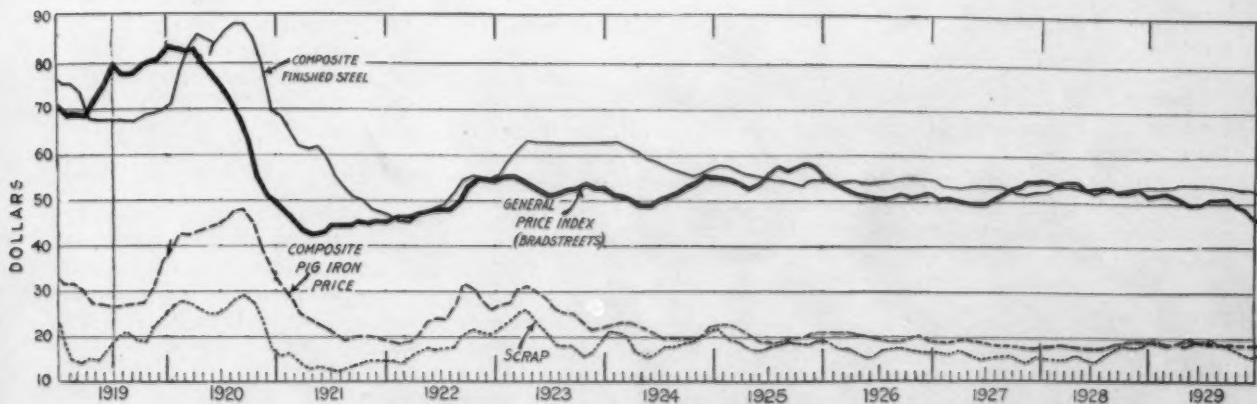
mouth, (2) reduced profits and purchasing power for the producers of raw materials, (3) a tendency to lower interest rates and higher bond prices, (4) general disturbance of business caused by changes in price relations and less optimistic sentiment.

The Bradstreet index of commodity prices is one of the very best for measuring the trend, for it is highly sensitive and is relatively free from the arbitrary weighting of particular commodities. On March 1, this index fell to the lowest level reached since September, 1921, thus being but a little above the low point of the post-war deflation. Though it has been sagging for two years, its decline since last September has become more rapid.

## Steel Prices Likely to Decline

Yet the average price of finished steel has participated relatively little in the general decline. In February it averaged about the same as in November, 1927, and in August, 1922. (Pig iron has declined only to the October, 1928, level.) In fact, finished steel prices, in spite of a little decline in January and February, averaged the highest in comparison with the Bradstreet index since August, 1924. There is no reason for assuming that steel production costs have declined any more or any less than costs of the average manufactured product. We know that the unit costs of the steel makers must have increased somewhat on account of reduced volume, and both pig iron and steel scrap are *relatively* high in price.

In view of this situation and our experience with similar situations in the past, the following opinions seem justified: (1) Finished steel prices are "out of line" with the general price level; (2) they are likely to decline further; but, (3) steel prices are so low in comparison with raw materials, steel supplies so well adjusted to demand, and the general decline of prices so moderate in degree, that any further recession in the steel markets does not seem likely to be drastic.



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## Use of Oil, Gas, Electricity Gains at Expense of Coal

Keen competition between the different modern sources of fuel and power is reflected in an analysis of world energy production for the 15-year period 1913-1928, made by the National Industrial Conference Board, New York. The production of crude oil and of hydroelectric power increased 243 and 162 per cent, respectively, and that of natural gas by 133 per cent. Coal is still by far the most important source of energy, but 1928 world output was only 5 per cent greater than that in 1913, world coal consumption having become practically stationary during recent years.

Depression of the industry in the older coal mining areas during post-war years has been due not to any one but to four major causes: (1) the increased output of useful energy per ton of coal; (2) increased coal production in new mining areas both in Europe and the United States; (3) rapid expansion in the production and consumption of oil and natural gas, and (4) the growing development of hydroelectric power.

# Drastic Price Changes Are Not Likely

BY LEWIS H. HANEY

Director, New York University Bureau of Business Research

PROBABLY the outstanding fact concerning the general business situation is the continued recession of the general level of commodity prices. The decline has been so broad and persistent, and has carried the average price so low, that it cannot be dismissed as being of minor importance.

In the first place, the causes of declines are significant. These must be found in widespread over-production and in the relative scarcity of gold.

## Overproduction Must Be Widespread

Overproduction of commodities is apparent in a dozen basic products—overproduction in the sense that supplies cannot be sold at a profit to the holders thereof. Silver, zinc, rubber, oil, sugar, coffee, automobiles, radios, silk, and possibly cotton and wheat, at once come to mind. In not a few cases the over-production is due to the inability of the consumer demand to absorb the supply of finished products at previously prevailing prices. This is true, for example, of gasoline, silk hosiery, refined sugar, and residential building.

Once started, such a broad decline in prices operates in a vicious circle, for unemployment results and serves further to reduce consumption, and buyers are prone to postpone purchases just because prices are declining. Moreover, price declines in one raw material are likely to affect more than one finished product, and several products may be affected by the price of a given substitute product. Thus the movement spreads and gains momentum.

## Relative Scarcity of Gold

As to gold, the situation has doubtless been affected by the eagerness with which various nations have sought to build up their gold reserves, thus increasing the value of the precious metal, and tending to reduce the general price level.

Among the broader effects of declining commodity prices we may mention the following: (1) a tendency to withhold orders and buy from hand-to-

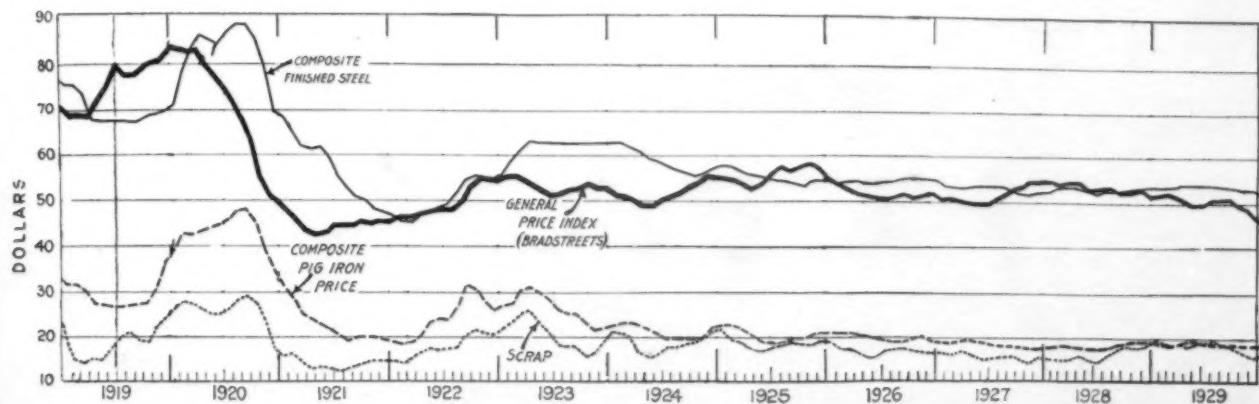
mouth, (2) reduced profits and purchasing power for the producers of raw materials, (3) a tendency to lower interest rates and higher bond prices, (4) general disturbance of business caused by changes in price relations and less optimistic sentiment.

The Bradstreet index of commodity prices is one of the very best for measuring the trend, for it is highly sensitive and is relatively free from the arbitrary weighting of particular commodities. On March 1, this index fell to the lowest level reached since September, 1921, thus being but a little above the low point of the post-war deflation. Though it has been sagging for two years, its decline since last September has become more rapid.

## Steel Prices Likely to Decline

Yet the average price of finished steel has participated relatively little in the general decline. In February it averaged about the same as in November, 1927, and in August, 1922. (Pig iron has declined only to the October, 1928, level.) In fact, finished steel prices, in spite of a little decline in January and February, averaged the highest in comparison with the Bradstreet index since August, 1924. There is no reason for assuming that steel production costs have declined any more or any less than costs of the average manufactured product. We know that the unit costs of the steel makers must have increased somewhat on account of reduced volume, and both pig iron and steel scrap are *relatively* high in price.

In view of this situation and our experience with similar situations in the past, the following opinions seem justified: (1) Finished steel prices are "out of line" with the general price level; (2) they are likely to decline further; but, (3) steel prices are so low in comparison with raw materials, steel supplies so well adjusted to demand, and the general decline of prices so moderate in degree, that any further recession in the steel markets does not seem likely to be drastic.



Steel Prices Are Regarded as Still Out of Line But Hardly Subject to Any Drastic Decline

# This Issue in Brief

Unproductive delay of machines is a great source of waste in the average plant. Movement of materials should be planned and scheduled so that wasteful waits will be eliminated.—Page 779.

\* \* \*

Obsolete machines are a mark of obsolete brains, says manager of machine tool association. User of out-of-date machinery reverses the philosophy of the machine age and "spends the man to save the machine."—Page 794.

\* \* \*

Give the workmen half the money you save by installing a wage incentive plan. Any incentive plan, to be a thorough success, must be based on something like a fifty-fifty split.—Page 786.

\* \* \*

Assigning each foreman to investigate a particular kind of waste, and requesting a written report of his findings, results in foremen learning a lot about their jobs that they never knew before. And now the manufacturer who conceived this idea has an encyclopedia of valuable information.—Page 780.

\* \* \*

If the cutting tool has a well backed up cutting edge, such as a lathe or planer tool, a high-speed steel with a high carbon content, about 0.75 per cent, or else a special type should be selected. But for drills, taps, milling cutters, etc., 0.70 carbon is recommended.—Page 784.

\* \* \*

Choosing the right steel for forming dies is far more difficult than getting the right cutting tool. The large number of types of forming dies, each with its own peculiar requirements, makes it necessary to weigh carefully many elements before an intelligent selection can be made.—Page 785.

If there is considerable play in the blades of your shears, toughness may be of greater importance than wearing ability, in which case chrome-vanadium tool steels are quite widely used. If the material is cut hot, high-speed steel may give excellent results.—Page 784.

\* \* \*

Twenty-one per cent gain in February daily steel output over January. Daily rate of 169,499 tons was only 6 per cent under February, 1929, which established a record for that month.—Page 805.

\* \* \*

Sponge iron is usually too high in price to compete with scrap. It can become an economic success only if it can be produced cheaply enough to compete with other melting materials.—Page 791.

\* \* \*

What is the most economical quantity of goods to produce in a given lot? That, says Dean Kimball, is one of the questions manufacturers will answer during the next quarter century, in which empirical management will give way to scientific management.—Page 781.

\* \* \*

Beware of the speed artist. In applying the production bonus remember that the best results are obtained when the gang is working steadily all day, but not at a pace which will tire them out. The speed artist does not last.—Page 786.

\* \* \*

To be successful, the wage incentive plan must enable the man to increase his earnings materially, from 20 to 25 per cent; it must fit in with changing conditions; it must be simple enough to require a minimum of clerical help, and it must promote teamwork.—Page 786.

Highest known resistance to wear (1000 Brinell), plus any desired strength, is provided by nitriding. Large forgings are now being nitrided in oil-fired, car-type furnace. Some users believe that costs will be less than with alloy steel parts.—Page 787.

\* \* \*

Foremen prepare a production manual. Each foreman in Ohio plant has prepared a paper on the different factors affecting yield in his particular department. The resulting manual of production is invaluable to the manufacturer.—Page 780.

\* \* \*

Defects in copper wire are caused by dies with bells at too wide an angle, says wire manufacturer. Check marks are the result of excessive draft at the broken surface.—Page 792.

\* \* \*

Does your foreman understand cost sheets thoroughly? If he does not, he may be too proud to admit it. You can educate him in this essential of industrial economy through weekly meetings.—Page 779.

\* \* \*

Guard the workers when mechanizing. The heavy shock of readjustment can be avoided if the management is far-seeing enough to prepare the workers for it in advance.—Page 794.

\* \* \*

Steel prices are likely to decline further, says Dr. Haney, but any further recession does not seem likely to be drastic. For steel prices are low in comparison with raw materials.—Page 807.

\* \* \*

Thousands of dollars saved one manufacturer by budgeting the "supplies" item. Finds that waste is reduced by establishing a quota for lubricants, canvas gloves, etc.—Page 780.

# Public Works Program Is Going Ahead

Actual Status of Governmental Activities Difficult to Measure, But All Undertakings Are Being Expedited

WASHINGTON, March 11.—The precise status of the public construction program of \$3,500,000,000 for 1930 is difficult to state, according to Government authorities, but they have emphasized that large operations already are under way, others soon will be started, some will be submitted for bids soon, and additional ones await legislation.

It was further pointed out that many operations involve various contracts, such as those calling for excavation, building materials and other items. It was said that this made it a complex matter to state definitely the actual progress that is being made, but that work is being expedited as much as possible. It also was asserted that, while the public construction program is considerably larger than that reported at the meeting of the National Business Survey Conference, the exact percentage of increase cannot be determined until the full programs are definitely worked out. So-called progress charts of work under way, pending, etc., were declared to give only an approximate idea of the situation.

## Congress to Take Action

Except for the final returns or estimates received from 36 States, the statement of Secretary of Commerce R. P. Lamont, published yesterday, largely reflects reports by Dr. John M. Gries, chief, Division of Public Construction, Department of Commerce, and from public utilities, which were outlined in THE IRON AGE of March 6, page 736. Further efforts, however, are being actively pushed to develop the programs and to bring them to a conclusion so that operations may be started as soon as possible.

With this plan in mind, the subcommittee of the Senate Commerce Committee will begin hearings tomorrow, according to present plans, on the unemployment situation. The subcommittee is headed by Senator Johnson of California. His announced purpose is to confine the hearings to a "factual" study of means of helping the situation at as early a date as possible and in this connection it was stated that among measures to be pressed for passage in Congress is one providing \$230,000,000 for public buildings and another appropriating \$125,000,000 for Federal aid roads, increased from \$75,000,000. The hearings will be on a bill by Senator Wagner, New York, which would institute Federal employment agencies in cooperation with the

States to set up an advance employment planning program.

## State Programs Large

The statement made by Secretary Lamont said final returns just received from Gov. John S. Fisher of Pennsylvania, reporting a total of \$305,988,118 for construction, and maintenance of State, county and municipal public works, added to previous estimates of \$475,275,442 for New York and \$233,225,000 for Ohio, brought the indicated 1930 expenditures for the three States to more than \$1,000,000,000. On the basis of complete reports from the Governors of 36 States, together with reports from Federal departments and commissions and public utility companies, "prompt decisive action in speeding up this year's \$7,000,000,000 program of construction work \*\*\* seems well established," according to Secretary Lamont.

Other States, in addition to Pennsylvania, for which Governors' estimates were not stated in previous announcements by the Department of Commerce, include Michigan, \$93,000,000, exclusive of county items; Iowa, \$70,000,000; Kentucky, \$51,670,000; Maryland, \$48,860,000; Rhode Island, \$20,000,000; Utah, \$8,800,000; Nevada, \$3,250,000.

Speaking of Congressional legislation enacted and proposed, Dr. Gries said sites now are being selected in accordance with the Rogers bill, which was passed Dec. 28, 1929, calling for \$15,950,000 for hospitals for veterans. The Elliott bill, providing for an addition of \$230,000,000 for the 10-year public building program, has passed the House and is pending before the Senate. One of its provisions, Dr. Gries pointed out, which is of special importance now, would enable the Treasury Department to make greater use of private architects in the designing of buildings. This provision would mean the hurrying up of the work.

The Dowell bill, authorizing an increase of Federal aid highway funds from \$75,000,000 to \$125,000,000 a year, or an increase of \$50,000,000, has passed the House and is pending before the Senate.

Dr. Gries also stated that several of the regular departmental appropriation acts now pending in Congress have made funds for certain construction projects in the 1931 budget available upon passage of the act.

"This means that they can get under way as soon as these acts are passed instead of having to wait until

July 1," said Dr. Gries. "Some of the items that might thus be advanced are \$500,000 toward the construction of airways, the construction of additional patrol boats for the Coast Guard and all construction items for the Bureau of Reclamation and the National Park Service.

"If other items included in the 1931 budget were made available immediately, numerous projects, such as schools and hospitals for the Indian Service, also could go ahead promptly."

## Maintained Expenditures Count More Than Increase

"It is not so much the increase over normal expenditures that counts as the prevention of a drop such as has usually taken place during the past depressions. If governmental agencies and corporations with available surpluses can and do maintain the line A-B (see chart), it will have a tremendous effect on all business activity. Both the large corporations and governmental agencies are starting upon a course which indicates that something worthwhile will be accomplished.

Delay in the Senate in acting upon pressing appropriation bills, including those for public construction, has aroused considerable criticism. The point has been made that if it disposed of the tariff bill and took up these appropriation measures quick stimulation of business would ensue. Secretary of Labor James J. Davis in effect made the same contention in reply to criticism coming from Congress about the unemployment situation and what was held to have been inadequate measures for its solution.

## Criticism of Administration Challenged

The statement given out last week by President Hoover declaring that "all evidences indicate that the worst effects of the crash upon employment will have been passed during the next 60 days with the amelioration of seasonal unemployment, the gaining strength of other forces and the continued cooperation of the many agencies actively cooperating with the Government to restore business and to relieve distress," also was subjected to criticism. The claim was made that ever since the collapse of the securities market last November, statements have been issued repeatedly carrying an optimistic tone and implying that any effect on prosperity had been slight and that any slowing

down in the business and industrial life of the nation was either largely seasonal or reflected moderate readjustments in the economic conditions. For the President to say that it will be 60 days before prosperity has been fully restored was held to have run counter to previous statements. Administration supporters, however, challenge the criticism as being unjust and contend that it has been conceded from the outset that the crash had hurt business but that, with co-operation of the Congress and business interests of the nation, it would be greatly alleviated and prosperity restored within a reasonable time. It

per cent in this period, it was stated, and the following were listed as being among the industries which show improvement: automobiles, car building and railroad supplies; iron and steel, agricultural implements and electrical trades; millinery and shipbuilding. The distribution of abnormal unemployment, the report said, shows that for 36 States the amount is unimportant and that any pressure is being cared for by the local authorities.

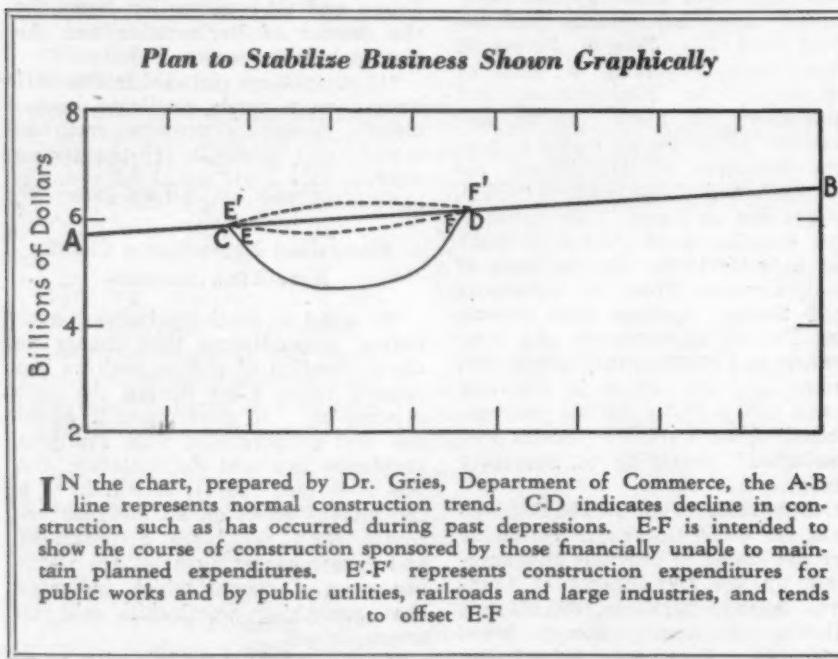
"The forces of recovery are steadily gaining strength; the winter seasonal unemployment will soon relax and therefore the next 30 to 60 days

and commercial purposes. One result is that an increasing volume of bond issues have been placed for public improvements. Available money for mortgage purposes of home building and agriculture has lagged behind other forms of credit. But a decrease in demands of policyholders for loans on the insurance companies and the action recently taken by the Federal Reserve System should result in increased supplies of credit, especially for residential building, which in turn has lagged behind other construction."

### Cotton Tie Market Opened

The cotton tie market has been opened by domestic mills with the announcement of a price of 85c. a bundle, f.o.b. Gulf or Atlantic port. This quotation is for spot shipment or for delivery at the option of the mills (within the next 30 days or so), and is not intended as the price for the entire season. The base price is for large quantities. For carload lots an extra of 2c. a bundle is charged; for less-than-carload lots an extra of 5c. a bundle is added. The price for cotton ties in carload or less-than-carload out of warehouse at ports is 90c. a bundle. At warehouses in the interior the freight from Gulf ports will be added to the seaboard price of 90c.

The United States Steel Corporation has largely concentrated its production of cotton ties at the works of the Tennessee Coal, Iron & Railroad Co.



**I**N the chart, prepared by Dr. Gries, Department of Commerce, the A-B line represents normal construction trend. C-D indicates decline in construction such as has occurred during past depressions. E-F is intended to show the course of construction sponsored by those financially unable to maintain planned expenditures. E'-F' represents construction expenditures for public works and by public utilities, railroads and large industries, and tends to offset E-F

is contended that, had the President not called in business for its cooperation, conditions would be infinitely worse than they are, with scant prospect of recovery to a normal basis in the near future.

#### Unemployment Reported Receding

The President's statement was prompted by a joint report made by Secretary Lamont and Secretary Davis, based upon departmental surveys of the industries and upon information furnished by Governors, mayors and other sources. The report estimated that there had been a decline of 1,000,000 and not more than 1,250,000 in the number of persons employed on Feb. 17 compared with the same date one year ago. The normal seasonal unemployment in the building trades at this time of the year, the report said, is about 30 per cent, while returns show the present actual unemployment in this field to be about 40 per cent, or an abnormal number of about 10 per cent. Moreover, various surveys were said to show that, based upon all trades, there has been an increase in employment of somewhere from 600,000 to 1,000,000 since the low point at the beginning of the current year.

In factory industries, as a whole, employment has increased about 8

should show much further improvement," said the report.

#### Repair Work Emphasized

"It would assist greatly during this period if every business concern and every householder able to do so, would survey their situation as to repairs, clean-ups and betterments that must be undertaken sooner or later, and have them put in hand now with a view to relieving the immediate distress in their localities. It is, of course, of paramount importance that the governmental bodies, the railroads, public utilities and industries should continue their able cooperation toward recovery by every prudent expansion of their construction and betterment programs."

In the course of his statement, the President said that the undertakings to maintain wages have been held. He declared that the amount of unemployment is, in proportion to the number of workers, considerably less than one-half, probably one-third, of that which resulted from the crashes of 1907-8, 1920-22, at this period of the situation.

"Measures taken to ameliorate interest rates have resulted in continuous decrease since December," said President Hoover, "and money is available at lower rates for business

### Austin Co. Takes Several Building Contracts

The Austin Co., Cleveland, during the week took contracts for the design and construction of a number of industrial buildings in various parts of the country. These include a \$50,000 shipping building for the Osborn Mfg. Co., Cleveland, manufacturer of molding machinery; a 100 x 200 ft. extension for the Wildman Mfg. Co., Norristown, Pa., manufacturer of knitting machinery; a warehouse and garage to cost \$200,000 for the National Grocery Co., Seattle, Wash.; a building for the Coast Mfg. Co., Livermore, Cal., for testing and storage of fuses for explosive use, and an assembly building, 70 x 180 ft., for the Bryon Jackson Co., Los Angeles, Cal., manufacturer of oil and deep well pumps.

### Republic Headquarters To Stay in Youngstown

Headquarters of the Republic Steel Corporation will remain in Youngstown, according to an announcement by Elmer T. McCleary, president. There had been some talk that the general offices might be moved to Cleveland. Mr. McCleary also stated that new directors of the Republic company will be elected in about three weeks.

## Declares Rates to Detroit Have Been Prejudicial

WASHINGTON, March 10.—Fifth class rates charged on iron and steel products in carloads from points in Pennsylvania, West Virginia, Ohio, Indiana and Illinois to Detroit were not unreasonable but were unduly prejudicial in the past, according to a decision made public yesterday by the Interstate Commerce Commission. The commission said that no order was necessary, since the rates prescribed in the general steel rate case, covering Official Classification territory, will result in reasonable rates and remove any undue prejudice which has existed in the past.

The decision was based on a complaint made by the Detroit Steel Corporation, and others, including both sellers and users of manufactured iron and steel products.

It was charged that the rates prevailing subsequent to April 15, 1925, have been unduly prejudicial and discriminatory. The fifth class rates charged range from 2½c. to 4½c. per 100-lb. over those which will prevail when those prescribed in the general rate case become effective on May 20. The Pittsburgh-Detroit fifth class rate is 29c. It will become 26.5c., a reduction of 2½c. The Massillon-Detroit fifth class rate is 25.5c. It will become 21c., a cut of 4½c. The Chicago-Detroit fifth class rate is 27.5c. It will become 24.5c., a reduction of 3c. The Fort Wayne, Ind.-Detroit fifth class rate is 22c. It will become 19c., a reduction of 3c.

The commission said that the fifth class rates complained of have generally exceeded commodity rates applied in the past to iron and steel to other points in Official Classification territory and that this difference resulted in inconvenience in the making of shipments between Detroit and other points in that territory.

## Standards Association to Extend Its Activities

The appointment of Cyril Ainsworth, formerly director of the bureau of industrial standards of the Pennsylvania Department of Labor and Industry, to direct the national safety code work of the American Standards Association, has just been announced by William J. Serrill, president of the A. S. A. Mr. Ainsworth will direct the work of the association in the establishment of national codes for the guidance of State and municipal governments, industrial organizations and insurance companies.

Mr. Serrill also announced the appointment to the A. S. A. staff of John Wilson McNair, formerly of the standards department of the American Institute of Electrical Engineers, and Clarence Edward Darling, formerly of the staff of the American Society of Mechanical Engineers. These appointments are part of a program of extension of national in-

dustrial standardization activities, which follows the recent refinancing of the A. S. A., as a result of which the association will have nearly \$500,000 available for its work during the next three years.

Safety code work is one of the most important of the association's present activities; 50 national safety codes have already been adopted under A. S. A. auspices. The number of codes is steadily growing. Mr. Ainsworth brings to the safety code work experience with the construction department of the Pennsylvania Railroad and the United Gas Improvement Co., Philadelphia, as well as with the Pennsylvania Department of Labor and Industry.

Mr. McNair will devote most of his efforts to electrical standardization projects. Before joining the staff of the American Institute of Electrical Engineers, he was connected with the National Electric Light Association and with the United Electric Light & Power Company.

Mr. Darling has had considerable experience in the field of mechanical standards as a member of the staff of the American Society of Mechanical Engineers. He has also been connected with the Public Service Corporation of New Jersey. He will handle especially mechanical and chemical projects.

## Limestone Freight Rate to Youngstown Increased

WASHINGTON, March 11.—Effective on Thursday of the present week, the railroad rate on furnace or foundry limestone, in carloads, from Hillsville, Shaw Junction and Walford, Pa., to the Youngstown district will be increased to 55c. a gross ton from the present rate of 42c.

The Interstate Commerce Commission, in a decision made public last Saturday, held that the proposed increased rate by the Pennsylvania and Pittsburgh & Lake Erie railroads was justified. The 42c. rate went into effect on Aug. 25, 1928. For about five years prior to that date the rate was 55c., which the railroads have been successful in having restored over the protests of steelmakers and other interests in the Mahoning Valley.

## Reinforcing Institute to Meet at Augusta, Ga.

The sixth annual meeting of Concrete Reinforcing Steel Institute will be held March 31 and April 1 and 2 at Hotel Bon Air-Vanderbilt, Augusta, Ga. Reservations are in charge of M. A. Beeman, secretary, Tribune Tower, Chicago.

A meeting of the board of directors, regional conferences and the opening session of the institute will take place March 31. George B. Walbridge, president Walbridge-Aldinger Co., contractor, Detroit, will deliver a talk,

"Cooperation in the Building Industry."

Committee reports, election of officers and directors, a moving picture, "How New Billet Bars Are Made," and a talk, "Warehouse Operations," will be presented April 1, in the morning. The annual banquet will take place at 6.30 p.m. Edward McKernon of New York, formerly with the Associated Press, will deliver a talk, "Not for Publication."

The morning session on April 2 will include committee reports, discussion of the enforcement of trade practice conference rules, unfinished business and a talk by the institute engineer, R. W. Johnson, on "How Water Cement-ratio Courses Widen the Market for Reinforcing Steel." The closing session, at 7.30 p.m., will include a report of the forms department on concrete joist construction.

## Milwaukee Opposes Rate Rise on Cast Iron Pipe

The city of Milwaukee, through Mayor Hoan and H. P. Bohmann, superintendent of the municipal water department, has made a protest to the Interstate Commerce Commission against its order increasing freight rates on cast iron pipe variously from \$1.50 to \$2 a ton. The increase is to become effective March 20.

The city contends that no request for higher rates was made by the railroads and that no hearing was granted. The city's 1930 program calls for approximately 8000 tons of 6 to 54-in. pipe, and it is pointed out that increased freight rates would add approximately \$15,000 to the cost this year alone. A five-year program of laying 250 miles of main, principally in newly annexed territories, is planned, making the extra cost an even more material sum.

## Steel Corporation Orders Gain 11,038 Tons

For the sixth month in succession unfilled orders of the United States Steel Corporation showed a gain. For February the increase was 11,038 tons comparing with 51,517 tons in January, 291,848 tons in December and 38,783 tons in November. The October and September gains were 183,981 tons and 244,370 tons, respectively. The total on Feb. 28 was 4,479,748 tons contrasting with 4,468,710 tons on Jan. 31. A year ago the unfilled orders were 4,144,841 tons.

Unfilled tonnage at the end of each month for the past two years follows:

	1930	1929	1928
February	4,479,748	4,144,341	4,398,189
January	4,468,710	4,109,487	4,275,947
December	4,417,193	3,976,712	
November	4,125,345	3,673,000	
October	4,086,562	3,751,030	
September	3,902,581	3,698,368	
August	3,658,211	3,624,043	
July	4,088,177	3,570,927	
June	4,256,910	3,637,000	
May	4,304,167	3,416,822	
April	4,427,763	3,872,133	
March	4,410,718	4,335,206	

The orders on Feb. 28, this year, were larger than in the previous three Februarys.

A. L. FINDLEY  
*Editor*

# THE IRON AGE

W. W. MACON  
*Managing Editor*

ESTABLISHED 1855

## Seeking the Good and Bad Spots

EVERYONE wants to know what are the good and what are the bad spots in business. Car loadings are commonly regarded as one trustworthy index to general trade and as they are given in detail as to certain commodities they might show something. Let us see. Below are given the number, by classes, of freight cars loaded in the first eight weeks of this year, with the percentage change from the same period of last year:

	Cars Loaded	Per Cent Change
Grain .....	331,645	-11
Live stock .....	210,996	-6
Coal .....	1,535,298	-7
Coke .....	90,841	-11
Forest products .....	399,049	-13
Ore .....	67,131	-8
Less carload .....	1,828,581	-3
Miscellaneous .....	2,391,845	-7
Total .....	6,855,386	-7

The figures are quite disappointing, the decreases being so uniform. They are rather too small to bother about. Perhaps the less than carload shipments having the smallest decrease is worth noting, it being a popular idea that when buyers are conservative less than carload purchases are encouraged. Much information, of course, may be locked up in the "miscellaneous," which comprises about 35 per cent of the total. In general the figures as far as they go suggest that there are no particularly good or bad spots.

Another method of approach would be to listen to what various trades say about their condition. One would find not a little variety but reflection tends to discredit any picture thus presented, for it can be recalled that in many instances those who complain now have complained in the past, when times were better.

Still another viewpoint might be taken, to divide ultimate buyers into two general classes: Corporations and individuals. Here it is clear that on the whole the corporations are doing the better, and with them are States, counties and municipalities. The general public is not doing so very badly, however, seeing that automobile production, said to be kept strictly within the limit of sales, has proved heavier than expected and the farm implement industry is very active.

Some observers make geographical distinctions, that the West is doing better than the East, but that is an old story, heard in every trade recession, and thus no useful light is thrown on the present situation.

There is room for conjecture that if we could find all the good and bad spots respectively, numerous and

in accurate detail, we should not be greatly enlightened, the good spots not being particularly good and the bad spots not particularly bad.

## Hard to Follow Flow of Steel

STEEL has gone into so many new uses that it is much harder than formerly to follow the ups and downs in its flow. Yet it is highly desirable to do this, because if we know where an increase or a decrease in demand for steel has occurred, we may be able to discern the reason for the change and judge how long the altered volume will prevail.

Reflection on the wide distribution of steel discourages a disposition to take a few groups of consumers and regard them as keys or indexes to the whole. There are certain activities, such as are represented in automobiles, fabricated structural and freight cars, with which everyone professes no little familiarity, but when an apparently formidable list of consumers is made up and their respective degrees of activity are estimated, it is found on scrutiny that their steel consumption does not run to so large a proportion of the total steel made as had been fancied. Hence the need of more detailed study of current trade conditions than is commonly given. The idea that certain activities in steel consumption are typical of the whole may be, and often is, erroneous.

Every current of steel into a given kind of consumption is likely to have a variation of its own. The steel producers are unable to give full details as to all these currents, their precise trends from time to time and their importance relative to the whole. Readily they pick out high and low spots, but these are only the more salient features. They are too busy securing and filling orders to give much study to such details. Of course they do consider carefully conditions with individual customers, but that is on a different basis.

Undoubtedly many observers feel they have an accurate picture of the whole steel situation, a trustworthy composite, if they know what is going on as to replacement rails for the railroads, freight cars and locomotives, fabricated structural steel, automobiles and agricultural implements. Nevertheless, after allowing for steel consumed in structural steel construction not represented in the fabricated structural contracts as let, we find that the sum total of all these activities in the last three years has amounted to only about three-eighths of the total steel production.

About the activities just mentioned there is fairly accurate and comprehensive information right along, but three-eighths is not necessarily an index to the

other five-eighths. The volume of rail replacements by the steam roads is not an index to demand by the industries and the electric lines or exports, yet this rail tonnage may be more than half as much as the replacement orders specifically reported. Freight car shops may be using much steel for car repair, apart from the steel represented in orders for new cars. There may be a great divergence in pace between fabricated structural steel construction on the one hand and the building of dwelling houses and construction work on farms on the other hand.

Frequently when the sum total of steel demand has increased or decreased explanation is offered by reference to changes in conditions in some of the lines referred to above, but it can be seen that such explanations may easily fall quite short of covering the ground.

In the old days of forward buying and buyers' carrying stocks which they were usually either building up or liquidating, steel was perhaps a more sensitive barometer than it is now. Today the steel maker has more occasion to watch conditions in the individual lines of consumption, for the lines do not follow similar courses so much as they did in the past.

### Structural Shapes of Aluminum

STRUCTURAL shapes of aluminum, alloyed of course to secure necessary physical characteristics, are now available on a commercial scale. Methods of their manufacture on a high output basis were detailed in these columns last week. What position they will find in the scheme of things remains to be seen, but it goes without saying that the Aluminum Co. of America will aggressively seek markets for them and counts on them to multiply considerably the tonnage of aluminum going into consumption.

Probably, as has been true in other cases of the coming of fresh inventions, new methods, or processes or materials, the new thing, however revolutionary it promises to be, settles into some definite place fixed by industrial economics. Competitive products or processes must stand displacement, but sooner or later they carve out stronger holds in perhaps a narrower field or force discoveries of new applications. The old as well as the new both expand in the long run, however, as the past has proved again and again.

In these observations there is no intention to discuss the likely future of the large aluminum structural sections. It remains, of course, that their first cost will enter largely into determining their acceptance. They will naturally get particularly active consideration in the case of structures subject to motion as distinguished from those that are stationary, for mass is a function of momentum, and aluminum is roughly one-third as heavy as steel. Lightness of part, as compared with steel, say, must be balanced, to mention one element in the competition, against a cost perhaps ten times as great. All of this has, of course, been thoroughly studied by the aluminum producers and the industrial world will not be left long waiting for the arguments.

The methods of manufacture, as clearly pointed out in the article, have their points of similarity to and differences from the rolling of steel. For one thing the metal is handled somewhat tenderly, apart from the

complete dependence on temperature control, as typified in the relatively light drafts made in the successive passes through the rolls, but one outstanding detail is the care necessary in pouring the ingots and the care to control the freezing and thus to avoid piping.

The great affinity of oxygen for the aluminum precludes any agitation of the stream of metal going into the mold, such as would likely draw in air and expose increased surfaces to oxidation, and the low temperature of solidification requires high preheating of the mold and very gradual outside cooling of it from the bottom upward. How this is done for the various size molds is described in the article and affords a striking illustration of the differences between handling steel and aluminum. A visitor to the Massena plant finds abundant evidence of the reign of science in the making of the product and of painstaking experimentation before the practical problems were solved.

### A Look at the Stock Market

EXAMINATION of the quotations for dividend-paying stocks reveals a good deal in respect to the state of mind of investors. In general there has been substantial recovery from the low points of last November, but in some instances there has not been any. However, there will be no dissent from the representation that the present position of the securities market is remote from that of speculative exhilaration.

Nevertheless, we find admittedly meritorious industrials like General Electric and Westinghouse selling for current yields of 2 to 2.6 per cent, with great utilities like A. T. & T. and Consolidated Gas at 3.25 to 3.75, and a long line of first class manufacturing companies like Union Carbide, Du Pont, Eastman Kodak, and Johns-Manville at 2.5 to 3.5 per cent. United States Steel itself returns only about 3.88 per cent.

This indicates that investors are still of the same mind as during the days of the boom, i.e., content to forego immediate income in the expectation of delayed appreciation. In the instance of a stock like International Nickel, selling on a basis of 2.56 per cent, the approach of higher dividends may be clearly visualized, while with the Standard Oils, which sell at 3.25 to 5 per cent, their past record of doucours and melons continues to inspire confidence. Inasmuch as nobody is expecting the resumption of a bear market, following the holocaust of last fall, it appears to follow that the former idea of values at 20 times earnings, or more, still prevails and that stocks with sound prospects found quoted on a 6 per cent basis ought to be good purchases. For example, the first class rails are ranging from 4 to 6 per cent, which probably presages an equalization downward rather than upward, i.e., as to yields.

The profound change in bases is to be found in the securities whose prospects do not look so rosy as they did a year ago, or in respect to which there are specific doubts. Thus, General Motors now sells for a yield of 7 per cent and some of the great independent oils for 8 per cent, reflecting industrial overproduction and the fear that correction of conditions may not occur so soon as the optimists expect. As a group the coppers are quoted for yields of 8 to 10 per cent, evincing skepticism of the maintenance of their dividends, in-

volving the thought that even if the producers hold their price their output will continue curtailed.

There is something rather paradoxical in this finding that while many groups of stocks sell in disregard of immediate yield others sell purely upon that consideration. The discrepancy is perhaps explained by the one word—prospect.

Anyhow, we are rather led to the conclusion that the upsetting of the speculative inverted pyramid in 1929 was not due to the fallacy of valuation upon the basis of a very high multiplier of earnings, but rather to the discernment that numerous industries were getting in a bad way through overproduction, and that if unsold stocks of goods had not already accumulated they soon would. The subsequent history of the commodity markets, the world over, has made this clearer. We begin to see that the stock market, following last midsummer, was acting as a barometer rather than an exploder and its only abnormality was in the magnitude of the speculative participation.

### The Foreman a Manager

TRAINING of foremen has been so universally adopted in industry that sometimes, because of the somewhat standardized manner in which it is generally handled, it fails to attract the attention it deserves.

Perhaps this is because the usual method is to meet in the classroom and discuss rather academically the problems which confront the foreman. The foreman's part has in large measure been confined to that of a spectator or pupil, and at best he occasionally participates in the discussion.

It is refreshing, therefore, to find a new and interesting approach to this vital subject. After all, the foreman is a manager, even though his is the smallest individual unit in the shop, and he deserves the title "foreman-manager."

In an article on page 777 of this issue is a description of how a large steel company has made each fore-

man, in effect, the proprietor of his own establishment and consequently responsible for its efficient management. The practical training of these men has been removed from the scholarly atmosphere of the classroom to the "University of the Mill." In other words, the weekly training period which the foreman usually is accustomed to has been superseded by a new program which calls for training every minute of the day while the foreman is on the job.

It is an engaging story which has resulted in greatly increased productivity and in a reduction of waste on the part of both the foremen and the mill workers. It points the way to a new and practical phase in raising the "key man of industry" to a higher degree of usefulness.

### Sponge Iron Versus Scrap

IT has been well said that the graveyard of sponge iron processes has many tombstones. Over half a hundred processes for this low-temperature reduction of iron ores have failed either because they were too expensive or because they did not produce a product over 90 per cent metallic iron. There is no question, however, that a properly reduced product, available in quantity, free enough from impurities and low enough in cost, would meet with favor as a raw material for steel.

Swedish metallurgists have succeeded in producing on a small scale a high-quality sponge iron which is being exported at the rate of over 11,000 tons annually (11,200 tons in 1929). The volume appears to be rapidly increasing; but it costs more than \$40 a gross ton delivered in this country. Manifestly its use is thus confined largely to high-quality electric tool steels and some high-grade open-hearth steels. At least, such has been its application in the United States. Quality scrap steel is much cheaper and until satisfactory sponge iron can be produced at a cost comparable with that of scrap, demand for it would seem to be definitely limited.

have a good grip of arithmetic, and are as much at home on one side of the decimal point as the other, but of the mental reactions of the so-called average man, who says quite candidly that he never could understand decimals at school, and cannot make head or tail of them.

There is a reason for this, deeper than mere laziness. No one thinks decimal any more than necessary. Starting with any unit, we like to multiply by two or three; much more, we like to divide by two, and again by two, which precisely explains why we have 16 ounces to the pound and not 10. The reason is that our human sense of rhythm prefers groupings or metrical feet of two beats, with three as a second choice, a fact well known to musicians. When music became recognized as mensuræ—post facto—measures of duple, quadruple and triple time were evolved. Most people can understand duple time instinctively, and triple time by application. Yet to some minds it is so artificial that considerable explanation is necessary.

Simple pulses can be combined in compound time, such as 6/8, which appeals because of its symmetry, and most people can realize that a musical sentence consists of four, eight, or perhaps 12 bars—that is, when it is shown to them. But the writing of music in quintuple time, such as 5/4, is rather a stunt. It is done and the music can be played, but no one is likely to whistle it.

Further, when musical notation had been improved to

### CORRESPONDENCE

#### Music and the Metric System

To the Editor—It is sometimes supposed that the passive resistance of English-speaking peoples to the compulsory use of the metric system is due to stubbornness, insularity and so forth, all of which may be taken as read.

On various occasions it has occurred to me that the reason is psychological, although I am cautious about using that over-worked term. The metric system has not lived up to its advertisements. It was the intention to use a natural, unchangeable standard, but this was not realized, and the metric unit is just as arbitrary as any other. Had an existing unit been adopted such as the yard of three feet, it would have linked the system with those in use, but this seems to have been avoided of set purpose.

The further claim is made that it is a decimal system. But that is chiefly of use in divisions, and we use decimal parts of feet or pounds just as much as we please. But most people dislike decimals, and use them only under compulsion.

It is not a question of what is done by those who

## The Week in Business

### Drift of Current Financial and Economic Opinion

BUILDING construction and automobile manufacture still are being closely watched as precursors of definite improvement in business. This is stressed by the National City Bank and by the National Industrial Conference Board. The latter notes that "building activity in the past has expanded within five to seven months after an easing in credit rates. This would bring an expected uprising in building operations in February, March or April."

The board says, also, "The further easing in credit, continued low stocks of manufactured goods and the long duration of the building decline point to higher levels, which probably will be marked by further resting periods like the present." No definite indication is noted anywhere that cheap credit is acting as a stimulating influence on business generally.

#### Spending Still Believed Good

"Largely mental" is a characterization of the "depression," used by *Commerce and Finance*, which says: "If accurate figures were available, it probably would be found that most wage-earners are spending about as much as a year ago. . . . Last year's expenditures were made with cheerfulness, while this year's appear to

be made with regret. . . . Measured in things and taken collectively, the country is far richer than when everyone wanted to buy stocks." "The thing most to be guarded against," the *Commercial and Financial Chronicle* reiterates, "is the speculative use of funds in stock market inflation."

#### Savings Deposits

Decline in savings bank deposits is noted by that publication to have occurred prior to the stock market collapse of last autumn, "which must have further seriously lowered the totals in deposits and depositors." But the New York Federal Reserve Bank finds "a somewhat larger increase (in deposits) between Dec. 10 and Feb. 10 than has occurred in the corresponding period of recent years. This increase follows a substantial withdrawal during and following the decline in stock prices. Savings deposits on Feb. 10 were slightly above the previous high figure, reached last July."

Commodity prices have "continued in recent weeks the decline which has proceeded almost without interruption since last July. Except for a moderate advance in late 1927 and in 1928, the general trend of commodity prices has been downward since the autumn of 1925," this bank points out.

This feature is commented on by the *Annalist*: "Lack of monetary gold in sufficient supply is evidently not the cause of the decline in prices since last summer. What seems to be the cause, operative here and in other parts of the world, is an excess of production over demand, or—one might better say—requirements."

Profits of 1509 corporations in 1929 are shown by the National City Bank as 39.3 per cent higher than in 1927 and 13.5 per cent above 1928. The 1929 total was about 6590 millions, despite three groups of industries showing deficits. This compares with 5806 millions in 1928 and nearly 4732 in 1927.

Indexes of business activity cited by the Federal Reserve Agent at New York include: "Average daily car loadings of merchandise and miscellaneous freight increased somewhat in the early part of January, but there was no further increase. . . . Distribution of goods to consumers apparently showed more than the usual reduction from the holiday high level of December. . . . The amount of life insurance paid for continued to increase and the bank's adjusted index equaled the level of last September, which was the highest since December, 1926."

the point of indicating the relative time values of notes, it was done in the most obvious way, by dividing the whole note into halves, quarters, and so on. A dotted note increases its time value one-half, which is clearly related to triple time. But no one ever thought of dividing music decimaly.

It may be noted also that bankers, who surely understand figures, persist in quoting rates fractionally, even with fine divisions, rather than decimaly. And the English people, with 20 shillings to the pound, persist in dividing it by 4 and 8 rather than by 10. The old 10-shilling pieces were always called half-sovereigns, and when the World War compelled the issue of 10-shilling notes, they were nicknamed Bradburys, after the signature they carried.

WILLIAM Q. PHILLIPS,

Secretary, Doherty Mfg. Co., Limited.  
Sarnia, Ontario, March 7.

Researches for this purpose were undertaken by the Technical Office for the Utilization of Steel. The type of steel finally selected is a chromium-copper steel containing 0.4 per cent copper to render it rust resistant. While the material is fairly cheap, its mechanical strength is about one and one-half times that of ordinary structural steel. Chemical composition is as follows: Chromium 0.4 to 0.6 per cent; copper 0.3 to 0.5; sulphur, less than 0.06, phosphorus, less than 0.07. Percentages of carbon, silicon, and manganese are left to the discretion of the manufacturer, subject to compliance with specified tests.

This chromium-copper steel is said to present no special difficulty in rolling of bars. Its qualities are not adversely affected by rapid cooling such as occurs after rolling bars of small section. It appears to have great chemical homogeneity throughout the bar and conserves the general qualities of mild steel. It can be cut, punched, and worked either hot or cold with ease in conditions comparable with those of mild steel. It can also be used for making rivets and can be welded, while its resistance to corrosion is undoubtedly greater than that of ordinary steels bearing no copper. In bar or sheet form mechanical tests are decidedly superior to those of mild steel, and it is suitable for many applications in framed structures, as well as ships, railroad engineering and automobile manufacturing.

#### New French Constructional Steels

THE French steel industry is addressing itself to the production of special structural steels, which can be furnished at a cost little in excess of ordinary steels. In an effort to forestall foreign competition, eight companies are now supplying these high-tensile steels.

# Iron and Steel Markets

## Steel Output Declines Further

Production for Country at Large Recedes Slightly, but Bookings Show No Reduction—Automobile Industry at 50 Per Cent Rate

WITH business unevenly distributed geographically and with demand for different finished products showing sharp contrasts, the steel market presents a confusing picture.

For the country as a whole, ingot production has declined from 78 to 75 per cent of capacity, but specifications have shown no further recession. At Chicago, on the other hand, output is holding at 95 per cent and bookings are the largest in five weeks. Production at Birmingham also exceeds 90 per cent, with finishing departments handicapped by a shortage of ingots.

Steel makers with diversified production are faring better than those specializing in flat-rolled products. The Steel Corporation average, although down a few points to slightly more than 80 per cent of capacity, is still considerably higher than the rate of manufacturers whose output is limited mainly to light forms of steel. This fact helps explain the Corporation's gain of 11,038 tons in unfilled tonnage in February, in the face of a high rate of operations during that month.

The outlook is for a continuation of the contrast between heavy and light products, since one of the chief uncertainties confronting the industry is the flow of steel to producers of consumer goods. Indications that consumer buying power has been seriously curtailed are seen in the current preference for low-priced automobiles, at the expense of higher-priced cars. But even motor car builders catering to the small purse have reduced production, one of them turning out not over 4000 and the other 2000 a day.

Total automobile output is now only 50 per cent of what it was in March, 1929, and this fact, coupled with the unusually cautious policy of motor car makers, accounts for a less confident attitude in the steel trade. In February, following the sharp rebound in demand in the previous month, steel ingot production reached 169,499 tons a day, or 86 per cent in terms of capacity as computed in December, 1928. Gratifying as this performance was, the industry does not look for its early repetition.

It is recognized that April may bring a seasonal upturn in demand and that requirements not directly dependent on the ultimate consumer may hold up or actually expand in the next few months, but, making due allowance for these contingencies, it is the present

consensus that the steel industry will do well if it again exceeds an 80 per cent operation during the first half of the year.

Seasonal influences are seen in improved demand for wire products and heavier operations of tin plate and pipe mills. Tin plate production now averages 85 per cent of capacity and pipe output ranges from 50 to 60 per cent. Manufacturers of tubular products are stocking more material as spring construction programs take shape. Residential building promises to be larger than had been expected. In keeping with the improved outlook, radiator plants have stepped up operations somewhat, although still running considerably below normal.

The price situation is poorly defined. On the one hand, certain mills are taking a firmer stand on prices and, on the other hand, evidences of fresh irregularities have cropped out. This may be only an apparent contradiction, however, since it is not an unusual practice to build up backlogs prior to taking a stronger price position. Some of the larger consumers of steel, particularly in the automotive industry, have obtained protection through the month of April. On automobile body sheets 3.80c., Pittsburgh, has not been uncommon and in extreme cases \$2 to \$4 a ton less has been done. On blue annealed sheets contracts at 2.55c. have been extended in certain instances, and similarly additional bar tonnage has been accepted at 1.80c. Tin mill black plate has declined \$1 a ton to 2.85c., Pittsburgh.

The cotton tie market has been opened with the announcement of a price of 85c. a bundle, f.o.b. Gulf or Atlantic port. This quotation is for early shipment and is not intended as the price for the entire season.

Scrap markets have a weaker tone, with heavy melting grade off 25c. a ton at St. Louis and Cincinnati, but unchanged at Pittsburgh and Chicago.

Pig iron prices are highly competitive, especially in territories reached by Alabama iron. Lake Superior charcoal pig iron has broken \$4 a ton, and basic pig iron in eastern Pennsylvania is off 50c. a ton.

THE IRON AGE composite prices are unchanged, pig iron at \$17.75 a gross ton and finished steel at 2.312c. a lb. Pig iron is 63c. lower than a year ago; steel is \$1.58 a net ton lower.

## A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,  
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Mar. 11, 1930	Mar. 4, 1930	Feb. 10, 1930	Mar. 12, 1929
No. 2 fd'y., Philadelphia.....	\$20.26	\$20.26	\$20.76	\$21.26
No. 2, Valley furnace.....	18.50	18.50	18.50	17.50
No. 2 Southern, Cln'ti.....	16.69	16.69	17.19	20.19
No. 2, Birmingham.....	15.00	15.00	14.50	16.50
No. 2 foundry, Chicago*.....	19.50	19.50	20.00	20.00
Basic, del'd eastern Pa.....	19.00	19.25	19.50	20.25
Basic, Valley furnace.....	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh.....	20.76	20.76	20.76	20.01
Malleable, Chicago*.....	19.50	19.50	20.00	20.00
Malleable, Valley.....	19.00	19.00	19.00	18.00
L. S. charcoal, Chicago.....	23.04	27.04	27.04	27.04
Ferromanganese, furnace.....	94.00	94.00	94.00	105.00

### Rails, Billets, Etc., Per Gross Ton:

Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh.....	33.00	33.00	33.00	34.00
Sheet bars, Pittsburgh.....	33.00	33.00	33.00	35.00
Slabs, Pittsburgh.....	33.00	33.00	33.00	34.00
Forging billets, Pittsburgh.....	38.00	38.00	38.00	39.00
Wire rods, Pittsburgh.....	38.00	38.00	40.00	42.00
Cents	Cents	Cents	Cents	
Skelp, grvd. steel, P'gh, lb....	1.85	1.85	1.85	1.85

### Finished Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.85	1.85	1.85	1.90
Bars, Chicago.....	1.95	1.95	1.95	2.05
Bars, Cleveland.....	1.85	1.85	1.85	1.90
Bars, New York.....	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh.....	1.80	1.80	1.80	1.90
Tank plates, Chicago.....	1.95	1.95	1.95	2.05
Tank plates, New York.....	2.07 1/2	2.07 1/2	2.07 1/2	2.17 1/2
Structural shapes, Pittsburgh.....	1.80	1.80	1.80	1.90
Structural shapes, Chicago.....	1.95	1.95	1.95	2.05
Structural shapes, New York.....	2.04 1/2	2.04 1/2	2.04 1/2	2.14 1/2
Cold-finished bars, Pittsburgh.....	2.10	2.10	2.10	2.20
Hot-rolled strips, Pittsburgh.....	1.80	1.80	1.80	1.80
Cold-rolled strips, Pittsburgh.....	2.65	2.65	2.65	2.85

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,	Per Lb. to Large Buyers:	Mar. 11, 1930	Mar. 4, 1930	Feb. 10, 1930	Mar. 12, 1929
		Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh.....		2.65	2.65	2.60	2.85
Sheets, black, No. 24, Chicago dist. mill.....		2.75	2.75	2.75	3.05
Sheets, galv., No. 24, P'gh.....		3.30	3.30	3.30	3.60
Sheets, galv., No. 24, Chicago dist. mill.....		3.40	3.40	3.40	3.80
Sheets, blue, No. 13, P'gh.....		2.25	2.25	2.25	2.20
Sheets, blue, No. 13, Chicago dist. mill.....		2.35	2.35	2.35	2.40
Wire nails, Pittsburgh.....		2.25	2.25	2.25	2.65
Wire nails, Chicago dist. mill.....		2.35	2.35	2.35	2.70
Plain wire, Pittsburgh.....		2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill.....		2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh.....		2.95	2.95	2.95	3.30
dist. mill.....		3.00	3.00	3.00	3.35
Tin plate, 100 lb. box, P'gh.....		\$5.25	\$5.25	\$5.25	\$5.35

### Old Material, Per Gross Ton:

Heavy melting steel, P'gh.....	\$16.75	\$16.75	\$17.00	\$18.25
Heavy melting steel, Phila.....	15.00	15.00	14.50	16.00
Heavy melting steel, Ch'go.....	13.25	13.25	13.25	15.50
Carwheels, Chicago.....	14.75	15.00	14.50	14.50
Carwheels, Philadelphia.....	15.00	15.00	15.00	16.50
No. 1 cast, Pittsburgh.....	14.50	14.50	14.50	15.00
No. 1 cast, Philadelphia.....	15.00	15.00	15.00	16.50
No. 1 cast, Ch'go (net ton).....	13.75	13.75	13.50	16.00
No. 1 RR. wrot, Phila.....	15.00	15.00	15.00	16.00
No. 1 RR. wrot, Ch'go (net).....	12.25	12.25	12.00	14.00

### Coke, Connellsville,

Per Net Ton at Oven:

Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$3.00
Foundry coke, prompt.....	3.50	3.50	3.50	3.75

### Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	18.12 1/2	18.12 1/2	18.12 1/2	20.12 1/2
Electrolytic copper, refinery.....	17.75	17.75	17.75	19.75
Tin (Straits), New York.....	36.62 1/2	37.00	38.87 1/2	48.37 1/2
Zinc, East St. Louis.....	5.00	5.10	5.20	6.35
Zinc, New York.....	5.35	5.45	5.55	6.70
Lead, St. Louis.....	5.35	5.85	6.10	7.15
Lead, New York.....	5.50	6.00	6.25	7.25
Antimony (Asiatic), N. Y. ....	8.75	9.00	8.75	9.37 1/2

Merchant wire products are also being advanced for the second quarter, with leading makers adhering to a minimum of \$2.30 on nails. This represents an advance of \$1 to \$2 a ton over some recent purchases, although no lower figure has ever been officially recognized.

On other products price changes will not affect the quoted levels, although in some cases adherence to present figures would represent advanced prices to some buyers. This is particularly true of plates and shapes, on which the 1.85c., Pittsburgh, quotation has been subject to considerable cutting in the last two months. Bar prices have constantly been more stable at the above figure.

The next two or three weeks will see a concerted effort on the part of mills generally to make a sellers' market out of a situation which has favored buyers for the last three or four months. It must be admitted that present quotations are not generally strong enough to provide much background for such a move, and the smaller steel companies have nothing in the way of a backlog which might support aggressive price stabilizing moves. Nevertheless, failure to adopt

## Pittsburgh

### Decline in Steel Buying Apparently Checked—Sheet Makers Seek Price Advances for Second Quarter

PITTSBURGH, March 11.—Declines in specifications for steel products, which were first noticed during the last week in February, seem to be checked, and business has been holding its own in the last few days, at least in the immediate Pittsburgh territory. In the Valleys and the Wheeling district, where flat-rolled products predominate, a slight falling off is still in evidence.

District steel ingot operations are still averaging at least 75 per cent of capacity, and the aggregate rate of finishing mills is aided by an increasing output of tin plate. The sheet industry is not running at more than 70 per cent, and strip operations have declined sharply since the first of the month. Bar mills are running at about 65 per cent, while pipe capacity is engaged at 40 to 50 per cent of theoretical capacity. A few of the smaller independent companies in the district are maintaining a surprisingly high rate of steel ingot production. The Pittsburgh Steel Co. expects to blow in its second blast furnace at Monessen, Pa., on March 11.

Large consumers of steel, particularly in the automobile industry, have begun to show interest in their second quarter requirements of sheets and strip. On account of the prospective advance of \$2 a ton in black and galvanized sheet prices, these consumers are anxious to get protection for their future needs, and in a few cases have been able to contract for their April requirements at present quotations. With the present concerted effort to advance prices on the part of leading sheet makers, it is not likely that buyers will be able to contract much farther ahead.

this policy would likely result in further general declines in price levels that would be highly unfavorable from the standpoint of ultimate profits.

Reports of incoming specifications are mixed. Companies with a widely diversified line of products find their business about equal to the average for the first two months of the year, while other producers, whose activities are confined principally to sheets, strips or bars, find tonnage releases rather discouraging.

The automobile industry is still looked upon as the deciding factor in the steel business for the first half of the year, and its plans are still undefined. A report that the leading maker would be on a schedule of 9000 cars daily by May 1 is regarded with skepticism in this district, but steel makers are agreed that the bulk of steel demand from the motor car industry this year will likely come from producers of cars in the low price class.

Other steel consumers, the demand for whose products must come directly from the ultimate buyer, are regarded with doubt as potential customers of the steel industry. On the other hand, there is nothing to indicate that there should be any particular falling off in the requirements of users whose product goes for purely industrial applications.

Projected gasoline and gas carrying pipe lines involve a large tonnage, and further large purchases will be required for civil engineering jobs now under way. Although the railroads have temporarily retired from the spotlight of steel for transportation purposes, steel mills will be engaged in the turning out of the orders they have placed for several months. An inquiry for 50 to 60 barges, calling for 5000 to 6000 tons of plates, came out here last week.

The pig iron market is still listless, but no specific breaks in prices have come to light. Recent declines at Chicago and Philadelphia have not affected the Valley market.

Scrap is holding at recent levels, with mill consumption keeping up at a good rate in this district.

**Pig Iron.**—One or two orders, calling for 1000 tons or more, were placed in this district last week, but buyers have

by no means departed from the now well established custom of covering their needs in small lots. In fact, even the most optimistic sellers of iron admit that new business taken during the first 10 days of March has been disappointing.

Shipments are keeping up and the largest merchant interest, operating two of its four furnaces, is delivering considerably more iron than it is turning out. This company plans to blow in the Neville Island, Pittsburgh, stack about April 1.

Two radiator makers in the district have stepped up their melt slightly in the last week, but this industry is still running at considerably below normal. Jobbing foundries are not doing very well. Basic and Bessemer iron is going to steel foundries at a slightly better rate.

A seller in the Valleys is reported to be trying to dispose of a few thousand tons of off-grade basic and Bessemer material at a favorable price, but this has not disturbed the price situation materially. Quotations are unchanged at \$18.50, Valley, for basic and foundry iron, and \$19 for malleable and Bessemer.

Reports of a possible advance in iron ore prices this season are not given much credence by Pittsburgh and Valley blast furnace interests.

Prices per gross ton, f.o.b. Valley furnace:	
Basic	\$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phosphorus, copper free	27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:	
Basic	\$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

**Semi-Finished Steel.**—Shipments of billets, slabs and sheet bars continue at a rather even rate, although the tonnage being taken by non-integrated strip makers is not as heavy as it was this time last month. This falling off is fully balanced by increases in the requirements of the smaller tin plate makers, which have been increasing their schedules steadily for some time.

Forging billets are also moving moderately well, and spot sales are not infrequent.

Sellers of the heavier semi-finished steel products have not announced second quarter prices, although no change is expected. Makers of wire rods are now generally quoting \$38, Pittsburgh or Cleveland, for second quarter, and a few buyers are showing interest in their requirements for that period. Shipments of rods to the bolt and nut makers are fairly good, and other consumers are holding to the rate which has prevailed for several weeks.

**Bars, Shapes and Plates.**—Specifications for plates and structural steel have not fallen off, although aggregate tonnage has shown little improvement in the last two or three weeks. A fair amount of tonnage from the railroad car builders in this district is now reaching the mills, but specifications on the bulk of this business are still being held up. Although car shops, supported by Pittsburgh mills, have not received any large orders in the last two or three weeks, their backlog is ample, and steel shipments to this channel in the second quarter will undoubtedly be heavy. The Standard Unit Navigation Co. has finally issued inquiry for 50 to 60 steel barges, which will require from 5000 to 6000 tons of plates. Otherwise barge buying is rather dull at the moment.

Structural fabricating shops are not adding to their backlog, but many of the larger ones are booked for two to three months at close to capacity. In the meantime, prospective construction projects will undoubtedly fill in a possible gap in operations.

Incoming bar tonnage is not up to the early February rate, although consuming lines other than the automotive industry seem to be taking steel at an equal, if not better, rate. Bar mill operations in the Valleys have declined fractionally, and the average for this and nearby districts is not over 65 per cent of capacity. Cold-finishing mills which ordinarily account for a heavy tonnage are not taking more than half their normal requirements.

Prices are fairly regular in this dis-

## THE IRON AGE Composite Prices

### Finished Steel

March 11, 1930, 2.312c. a Lb.

One week ago.....	2.312c.
One month ago.....	2.305c.
One year ago.....	2.391c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

High	Low
1930 2.362c., Jan. 7;	2.305c., Jan. 28
1929 2.412c., April 2;	2.362c., Oct. 29
1928 2.391c., Dec. 11;	2.314c., Jan. 3
1927 2.453c., Jan. 4;	2.293c., Oct. 25
1926 2.453c., Jan. 5;	2.403c., May 18
1925 2.560c., Jan. 6;	2.396c., Aug. 18

### Pig Iron

March 11, 1930, \$17.75 a Gross Ton

One week ago.....	\$17.75
One month ago.....	18.00
One year ago.....	18.38

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

High	Low
1930 \$18.21, Jan. 7;	\$17.75, Mar. 4
1929 18.71, May 14;	18.21, Dec. 17
1928 18.59, Nov. 27;	17.04, July 24
1927 19.71, Jan. 4;	17.54, Nov. 1
1926 21.54, Jan. 5;	19.46, July 13
1925 22.50, Jan. 13;	18.96, July 7

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

### Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.85c.
F.o.b. Chicago	1.95c. to 2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.00c.
Cif. Pacific ports	2.25c.
F.o.b. San Francisco mills	2.25c.

### Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	1.95c.
F.o.b. Pittsburgh mills, cut lengths	2.20c.
F.o.b. Birmingham, mill lengths	2.00c.

### Rail Steel

F.o.b. mills, east of Chicago dist.	1.80c. to 1.90c.
F.o.b. Chicago Heights mill	1.85c.
Del'd Philadelphia	2.12c. to 2.22c.

### Iron

Common iron, f.o.b. Chicago	1.95c. to 2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

### Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.80c. to 1.85c.
F.o.b. Chicago	1.95c. to 2.00c.
F.o.b. Birmingham	2.00c.
Del'd Cleveland	1.99c. to 2.04c.
Del'd Philadelphia	2.00c. to 2.05c.
F.o.b. Coatesville	1.90c. to 1.95c.
F.o.b. Sparrows Point	1.90c. to 1.95c.
F.o.b. Lackawanna	1.90c. to 1.95c.
Del'd New York	2.07½c. to 2.12½c.
Cif. Pacific ports	2.25c.

### Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.80c. to 1.85c.
F.o.b. Chicago	1.95c. to 2.00c.
F.o.b. Birmingham	2.00c.
Del'd Cleveland	1.99c. to 2.04c.
Del'd Philadelphia	2.00c. to 2.05c.
F.o.b. Coatesville	1.90c. to 1.95c.
F.o.b. Sparrows Point	1.90c. to 1.95c.
F.o.b. Lackawanna	1.90c. to 1.95c.
Del'd New York	2.07½c. to 2.12½c.
Cif. Pacific Ports	2.35c.

### Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.90c.
Wider than 6 in., P'gh	1.80c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.80c.

### Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	2.45c. to 2.40c.
Strips, P'gh	2.65c. to 2.75c.
Strips, Cleveland	2.65c. to 2.75c.
Strips, del'd Chicago	2.95c.
Strips, Worcester	2.80c. to 2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.00c.

\*According to size.

### Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland)  
To Merchant Trade

	Base per Keg
Standard wire nails	\$2.20
Cement coated nails	2.30
Galvanized nails	4.30

### Base per Lb.

	Base per Lb.
Polished staples	2.75c.
Galvanized staples	3.00c.
Barbed wire, galvanized	2.95c.
Annealed fence wire	2.45c.
Galvanized wire, No. 9.	2.90c.
Woven wire fence (per net ton to retailers)	\$65.00

### To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage..... 2.40c.  
Spring wire (Carload lots, f.o.b. Chicago)..... 3.50c.

Wire nails..... \$2.80 to \$2.45 (keg)  
Annealed fence wire..... 2.50c. to 2.60c. (lb.)  
Bright hard wire to manufacturing trade..... 2.45c.  
Anderson, Ind., mill prices are ordinarily \$1 a ton over Pittsburgh base; Duluth, Minn., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

### Cut Nails

Per 100 Lb.  
Carloads, Wheeling, Reading or Northumberland, Pa. .... \$2.55 to \$2.60  
Less carloads, Wheeling or Reading ..... 2.70

Light Plates			
No. 10, blue annealed, f.o.b. P'gh	2.10c.		
No. 10, blue annealed, f.o.b. Chicago dist.	2.20c.		
No. 10, blue annealed, del'd Phila.	2.42c.		

No. 10, blue annealed, B'ham..... 2.25c.

Sheets			
Blue Annealed			

Base per Lb.

Continuous Mill Sheets			
No. 10 gage, f.o.b. P'gh	1.90c. to 2.00c.		
No. 13 gage, f.o.b. P'gh	2.05c. to 2.15c.		

(Usual range 24 in. to 48 in. wide)

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh..... 2.65c. to 2.75c.

No. 24, f.o.b. Chicago dist. mill..... 2.75c. to 2.85c.

No. 24, del'd Philadelphia..... 2.97c.

No. 24, f.o.b. Birmingham..... 2.90c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh..... 3.90 c. to 4.00c.

Galvanized

No. 24, f.o.b. Pittsburgh..... 3.30c. to 3.40c.

No. 24, f.o.b. Chicago dist. mill..... 3.40c. to 3.50c.

No. 24, del'd Cleveland..... 3.49c. to 3.59c.

No. 24, del'd Philadelphia..... 3.62c. to 3.72c.

No. 24, f.o.b. Birmingham..... 3.45c. to 3.50c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh..... 2.85c. to 3.00c.

No. 28, f.o.b. Chicago dist. mill..... 3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh..... 3.90c.

Long Ternes

No. 24, 8-lb. coating I.C. \$10.70

25-lb. coating I.C. \$15.90

15-lb. coating I.C. 18.40

30-lb. coating I.C. 16.80

20-lb. coating I.C. 14.60

40-lb. coating I.C. 18.80

Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills..... \$5.25

Standard cokes, f.o.b. Gary..... 5.35

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$10.70

25-lb. coating I.C. \$15.90

15-lb. coating I.C. 18.40

30-lb. coating I.C. 16.80

20-lb. coating I.C. 14.60

40-lb. coating I.C. 18.80

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers Differential

2000 (1½% Nickel)..... \$0.25

2100 (1½% Nickel)..... 0.55

2300 (3½% Nickel)..... 1.50

2500 (5% Nickel)..... 2.25

3100 Nickel Chromium..... 0.55

3200 Nickel Chromium..... 1.35

3300 Nickel Chromium..... 3.80

3400 Nickel Chromium..... 3.20

4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)..... 0.50

4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)..... 0.70

4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)..... 1.05

5100 Chromium Steel (0.60 to 0.90 Chromium)..... 0.35

5100 Chromium Steel (0.80 to 1.10 Chromium)..... 0.45

5100 Chromium Spring Steel..... 0.20

6100 Chromium Vanadium Bars..... 1.20

6100 Chromium Vanadium Spring Steel (flats)..... 0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¼ c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

### Rails

Per Gross Ton

Standard, f.o.b. mill..... \$43.00

Light (from billets), f.o.b. mill..... 36.00

Light (from rail steel), f.o.b. mill..... 34.00

Light (from billets), f.o.b. Ch'go mill..... 36.00

Base per 100 Lb.</

trict, with the 1.85c., Pittsburgh, quotation likely to be extended into the second quarter. On plates and shapes, concessions are reported occasionally, although the general market is fairly well defined at the above figure.

**Rails and Track Supplies.**—Specifications thus far have been rather light, but the coming of milder weather is expected to bring out releases on a generous amount of business, which is now being held in the offing. Buying of track supplies is negligible, although many roads may be expected to bring out inquiry for second quarter requirements in the next week or two.

**Bolts, Nuts and Rivets.**—Slightly improved specifications in the last few days are reported from the bolt and nut industry, which had been depressed somewhat in the last half of February. Operations for the group as a whole are not far below 60 per cent of theoretical capacity, a figure which may be considered fairly good in view of the fact that industries seldom are called upon to use more than 75 to 80 per cent of theoretical facilities. Prices have held fairly well except in the case of very large tonnage consumers, with bolts and nuts quoted at 70 per cent off list, small rivets at 70 and 10, and large rivets at \$3.10, Pittsburgh or Cleveland.

**Tubular Goods.**—The pipe industry is still looking to the future, with current buying rather limited. Improved building operations in the spring months will soon have their effect upon the demand for standard tubing, although current shipments are somewhat below normal for this time of the year.

**Wire Products.**—Most of the principal makers have opened their books for second quarter at \$2.30 and \$2.40

a keg for wire nails, and are unwilling to take forward business at lower figures. Some \$2.25 and even \$2.20 tonnage may be carried into the second quarter, although specifications for this material will all have to be in by April 10. Merchant wire products in general are quiet and demand for fencing has failed to develop in the usual quantities.

**Sheets.**—The feature of the sheet market is the sudden interest of consumers in their future requirements. Many large buyers are asking for price protection in the second quarter on account of the announced intention of leading independent makers to advance quotations in that period. Although a few producers may be willing to take business for April at present figures, it seems unlikely that further protection will be given if the market retains its recent strength.

One large automobile maker which had asked for quotations on its total second quarter requirements has now decided to buy only for April, and this change of policy is taken to mean either that sellers were unwilling to extend prices over a longer period or that the automobile manufacturer had decided to be more cautious in its buying. A report that the leading automobile maker expects its daily production to reach 9000 cars by May 1 is encouraging, but manufacturers of cars in the medium price class are far from optimistic. A digest of conflicting reports from Detroit can best be summed up by saying that the automobile industry is still an enigma and, until it is solved by more definite manifestations of consumer demand, sheet steel makers will be unable to foretell the probable course of their business.

Specifications last week showed some improvement and operations for the industry this week will average about 70 per cent of capacity. Demand is well distributed among the different finishes, although galvanized material has failed to show any marked seasonal improvement. The price is well established in the northern part of the country at 3.30c., Pittsburgh, with 3.40c. asked on second quarter business. Other prices are unchanged, with the exception of tin mill black, which is now available at as low as 2.85c., Pittsburgh, a decline of \$1 a ton, from the recent minimum.

**Tin Plate.**—Specifications are gradually improving, and, with three or four leading independent makers running at close to capacity, the average for the industry stands between 80 and 85 per cent. With anticipated tonnage now largely out of the way, operations are governed entirely by current shipping orders, which may be expected to be influenced in the next two months by crop reports from the agricultural districts.

**Strip Steel.**—Business is dull, with operations as low as they have been since early January. Most of the inactivity is ascribed to small demands from the automobile industry, although other consuming lines are only moderately active for the season. Hot

mills in the district are not averaging more than 55 per cent, while cold-rolling units have fallen off to 35 or 40 per cent. Some new inquiry has appeared, but consumers seem more anxious to sound out the market than to place orders.

Weakness has appeared again in the Detroit territory, but producers have reaffirmed present quotations for second quarter and seem determined to resist pressure for concessions.

**Cold-Finished Steel Bars.**—Demand from the farm implement and machinery builders is fair, but automobile demand continues to be disappointing. Specifications this month are about equal to the February average, and new business is light.

**Coke.**—The market is without feature, with buying of the furnace grade confined almost entirely to carload lots for immediate shipment. Prices are steadier, with \$2.60, Connellsville, applying on nearly all the business.

**Old Material.**—Lack of consumer buying of No. 1 heavy melting steel in the last week has given the market a somewhat weaker undertone, although good scrap is rather scarce, and several dealers are shipping heavily out of their yards to cover recent sales. No. 1 heavy melting steel can be picked up by some dealers at as low as \$16, but such material is frequently rejected, and dealers' buying prices in general are not that low.

The closing of the Pennsylvania list on March 12 will throw some light on price tendencies, and, in the meantime, the market is best represented at the figures shown last week, namely \$16.50 to \$17. Hydraulic compressed sheets are weaker, with sales reported at two points, at \$16 and \$16.25. Offerings at the lower figure have been turned down in the last two days by at least two mills.

*Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:*

**Basic Open-Hearth Grades:**

No. 1 heavy melting steel.	\$16.50 to \$17.00
No. 2 heavy melting steel.	14.50 to 15.00
Scrap rails	15.50 to 16.00
Compressed sheet steel	15.75 to 16.25
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	18.00 to 18.50
Heavy breakable cast	12.00 to 13.00
No. 2 railroad wrought	16.50 to 17.00
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	11.00 to 11.50

**Acid Open-Hearth Grades:**

Railr. knuckles and couplers	20.50 to 21.50
Railr. coil and leaf springs	20.50 to 21.50
Rolled steel wheels	20.50 to 21.50
Low phos. billet and bloom ends	21.50 to 22.50
Low phos. mill plates	20.50 to 21.50
Low phos. light grades	20.50 to 21.50
Low phos. sheet bar crops	21.00 to 22.00
Heavy steel axle turnings	14.00 to 14.50

**Electric Furnace Grades:**

Low phos. punchings	19.50 to 20.00
Hvy. steel axle turnings	14.00 to 14.50

**Blast Furnace Grades:**

Short shoveling steel turnings	11.50 to 12.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50

**Rolling Mill Grades:**

Steel car axles	20.50 to 21.50
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**Cupola Grades:**

No. 1 cast	14.00 to 15.00
Rails 3 ft. and under	18.50 to 19.50

**Warehouse Prices, f.o.b. Pittsburgh**

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.80c. to 2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.60c.
Galv. sheets (No. 24), 25 or more bundles	4.25c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.25c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.40c.
Galv. corrug. sheets (No. 28), per square	4.13c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black, soft ann'd, base per 100 lb.	\$2.75 to 2.85
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg.	2.60 to 2.75
Cement coated nails, per keg	2.65 to 2.80

# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel

### Billets and Blooms

*Per Gross Ton*

Rerolling, 4-in. and under 10-in. Pittsburgh	\$33.00
Rerolling, 4-in. and under 10-in., Youngstown	33.00
Rerolling, 4-in. and under 10-in., Cleveland	33.00
Rerolling, 4-in. and under 10-in., Chicago	34.00
Forging quality, Pittsburgh	38.00

### Sheet Bars

(Open Hearth or Bessemer)

*Per Gross Ton*

Pittsburgh	\$33.00
Youngstown	33.00
Cleveland	33.00

### Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

*Per Gross Ton*

Pittsburgh	\$33.00
Youngstown	33.00
Cleveland	33.00

### Skelp

(F.o.b. Pittsburgh or Youngstown)

*Per Lb.*

Grooved	.185c. to 1.90c.
Universal	.185c. to 1.90c.
Sheared	.185c. to 1.90c.

### Wire Rods

(Common soft, base)

*Per Gross Ton*

Pittsburgh	\$38.00 to \$40.00
Cleveland	38.00 to 40.00
Chicago	39.00 to 41.00

## Prices of Raw Material

### Ores

#### Lake Superior Ores, Delivered Lower Lake Ports

*Per Gross Ton*

Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Adgerian	12.00c.
Iron ore, low phos., Swedish, average 68%	
Iron	12.00c.
Iron ore, basic Swedish, average 68% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$15.00 to \$16.00
Chrome ore, 45 to 50% Cr <sub>2</sub> O <sub>3</sub> , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS <sub>2</sub> , delivered	Per Lb. 50c. to 55c.

### Coke

*Per Net Ton*

Furnace, f.o.b. Connellsville prompt	\$2.60
Foundry, f.o.b. Connellsville prompt	\$3.50 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis..	9.00

### Coal

*Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 1/4-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

### Ferromanganese

*Per Gross Ton*

Domestic, 80%, seaboard	\$4.00 to \$99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

### Spiegeleisen

*Per Gross Ton Furnace*

Domestic, 19 to 21%	\$31.00 to \$34.00
Domestic, 16 to 19%	29.00 to 32.00

### Electric Ferrosilicon

*Per Gross Ton Delivered*

50%	\$88.50
75%	130.00

*Per Gross Ton Furnace*

10%	\$35.00
11%	37.00
	14 to 16%
	45.00

### Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

<i>Per Gross Ton</i>	<i>Per Gross Ton</i>
10%	12%
11%	12%

### Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

<i>Per Gross Ton</i>	<i>Per Gross Ton</i>
6%	22.00 to 23.00
7%	23.00 to 24.00
8%	24.00 to 25.00
9%	25.00 to 26.00

### Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd

.....\$1.40 to \$1.50

Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr, per lb. contained Cr, delivered, in carloads

.....11.00c.

Ferovanadium, per lb. contained vanadium, f.o.b. furnace

.....\$.15 to \$3.65

Ferrocobaltitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads

.....\$160.00

Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton

.....\$91.00

Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton

.....\$122.50

### Fluxes and Refractories

#### Fluorspar

*Per Net Ton*

Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines

.....\$18.00

No. 2 Lump, Illinois and Kentucky mines

.....20.00

Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid

.....\$18.25 to 18.75

Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines

.....32.50

#### Fire Clay Brick

*Per 1000 f.o.b. Works*

High-Heat Intermediate Duty Brick

.....\$35.00 to \$38.00

Maryland

.....43.00 to 46.00

New Jersey

.....50.00 to 55.00

Ohio

.....43.00 to 46.00

Kentucky

.....43.00 to 46.00

Missouri

.....43.00 to 46.00

Illinois

.....43.00 to 46.00

Ground fire clay, per ton

.....7.00

#### Silica Brick

*Per 1000 f.o.b. Works*

Pennsylvania

.....\$43.00

Chicago

.....52.00

Birmingham

.....50.00

Silica clay, per ton

.....\$8.50 to 10.00

#### Magnesite Brick

*Per Net Ton*

Standard sizes, f.o.b. Baltimore and Chester, Pa.

.....\$65.00

Grain magnesite, f.o.b. Baltimore and Chester, Pa.

.....40.00

Standard size

.....45.00

#### Chrome Brick

*Per Net Ton*

Standard size

.....\$45.00

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

### Bolts and Nuts

*Per 100 Pieces*

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

*Per Cent Off List*

Machiné bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

\*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including  $\frac{1}{4}$  in. x 6 in. take 10 per cent lower list prices.

### Bolts and Nuts

*Per Cent Off List*

Semi-finished hexagon nuts

70

Semi-finished hexagon castellated nuts, S.A.E.

70

Stove bolts in packages, P'gh.

75

Stove bolts in packages, Chicago.

75

Stove bolts in packages, Cleveland.

## Chicago

### Steel Buying and Specifications Still Impressive and Ingot Rate Remains at 95 Per Cent

**C**HICAGO, March 11.—Sales of several round tonnages of second quarter semi-finished steel, in addition to a substantial run of orders by miscellaneous users of finished products, have served to bring buying in the past week to an impressive point above the average so far this year. New orders for car material totaled about 20,000 tons and oil storage tanks account for 3000 tons.

For the most part, buyers' requirements are being stated at close range, but indications are that consumption is steady and some sellers are willing to venture the expression that March shipments will hold to the present rate and that a substantial April tonnage seems assured.

On the score of developments in the last week, it seems hardly necessary to point out that backlogs are losing no ground and that deliveries are not improving.

Ingot output remains at 95 per cent of capacity, and the employment of steel mill blast furnaces stands as it did a week ago.

It is significant that specifications for finished steel are the largest in five weeks, tonnages in only three weeks so far this year having been larger. This comparison is made without considering releases for rails and track supplies, specifications for which have already been entered on well arranged shipping schedules.

It seems more evident as time passes that present quotations on plates, shapes and bars will be carried over for tonnages that are to be delivered in the second quarter. Local sellers of sheets are still withholding second quarter price announcements, though one Ohio producer which markets part of its product in this territory has opened books at 2.90c. a lb., Chicago, for black sheets, 3.55c. for galvanized, and 2.25c. for No. 10 gage blue annealed sheets.

Southern iron is showing added weakness when delivery is specified in the Chicago district. Prices for charcoal iron have broken at least \$4 a ton, as producers bend their efforts to liquidate stocks.

**Ferroalloys.**—Specifications from steel mills and steel foundries are in good volume. A furnace at Sault Ste. Marie, Ont., is producing 50 per cent ferrosilicon, and it is reported that tonnages have been offered at Milwaukee, but information on sales in this country is lacking.

**Pig Iron.**—Producers of charcoal iron are openly in the market with prices that range from \$20 to \$24 a ton, furnace. In fact, this commodity has been offered at Milwaukee at \$21, delivered, with a freight rate of \$2.67, bringing the furnace price to \$18.33. Stocks at furnaces are reported to be large.

Southern iron for delivery in this territory continues to show weakness, as evidenced by prices quoted on 1000 tons placed this week. This business is said to have been taken at \$19.20 a ton, delivered. With the all-rail rate at \$6.01, the price for the grade at Birmingham would figure \$13.19. The standard differential for silicon is \$1, bringing the base price at Birmingham to \$12.19 a ton. If this tonnage was figured on the barge and rail rate, the

prices for cast iron pipe would hold, there is now a distinctly stronger tone to the market. Quotations here are \$37 to \$38 a ton, Birmingham, for 6 in. and larger diameters. The freight rate to Chicago is \$8.25 a ton, bringing the delivered quotations to \$45.20 to \$46.20 a ton. Although new orders have shown some improvement in recent weeks, foundries generally are able to ship many sizes on short notice.

Foremost among new requests for prices is one from Los Angeles, which will buy this week about 2000 tons of 6 and 8-in. pipe and which may later ask for prices on 1000 tons of 8-in. pipe. Galesburg, Ill., is preparing plans for a large sewage disposal plant, which will require several hundred tons of cast iron pipe. Kenosha, Wis., has come into the market for 300 tons of 10 to 20-in. pipe, and Oberlin, Ohio, is taking figures on 100 tons of 4 to 12-in. Public awards are not impressive, but business which seems to be in early prospect is giving encouragement to sellers. Lancaster, Ohio, has ordered 100 tons of pipe from James B. Clow & Sons.

**Prices per net ton, deliv'd Chicago:** Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$48.20 to \$49.20; Class A and gas pipe, \$3 extra.

**Rails and Track Supplies.**—Pressure for delivery of standard-section rails continues, with Chicago mills operating at capacity. This is not a time of the year when new orders are expected, but this week's business totaled more than 7000 tons, which represents the aggregate of three orders. Several contracts for track supplies have been placed, the total calling for about 6000 tons. The light rail market is without feature.

**Prices f.o.b. mill, per gross ton:** Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. **Per lb.:** Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07 1/2c. to 2.15c.; angle bars, 2.75c.

**Wire Products.**—Mild weather throughout most of the country in recent weeks is being reflected on the books of wire and wire products manufacturers. The increase in orders, however, is not up to expectations. Improvement in roads in recent years is an important factor in distribution at this time of the year, when country roads often are impassable. Orders from the manufacturing trade are steady, but small for this season.

Producers have opened second quarter books at present quotations, which are 2.45c. a lb. for bright hard wire to the manufacturing trade and \$2.35 to \$2.45 a keg for nails in carload lots. Demand for electrical wire is steady, the preponderance of orders being for the larger sizes and electrical cables.

**Bars.**—The market for soft steel bars is characterized by an unusually widespread and steady demand. Although last week was not outstanding in either specifications or new orders, the past few days have witnessed a recovery, so that March business is running parallel at least with the closing days of February. Speci-

fications are about 15 per cent heavier than in the previous week, while sales are even more impressive.

Although there is buying interest for second quarter, price policies have not been announced by local mills. Alloy bar mills are holding to production schedules that range between 65 and 70 per cent of capacity. Second quarter books are open at current quotations for alloy steel and iron bars.

Although books for the next quarter are not officially open on rail steel bars, sellers are accepting tonnages for delivery in that period at 1.85c. a lb., Chicago Heights mills.

**Plates.**—New orders for tank plates call for 3000 tons, and fresh inquiries total a like amount, so that the pending tonnage, about 35,000 tons, is still an important factor in this market.

Although specifications from car builders are still of large size, new business in sight from the railroads is not promising. The only inquiry of note in the West this week is for 250 cars for the Northern Pacific. Railroad tonnages for car repairs are light.

Tonnage prices are moderately steady at 1.95c. a lb., Chicago. Announcements as to the course to be taken in the second quarter by sellers are lacking, but the general impression is that present quotations will be carried through.

**Structural Material.**—This market is still concerned as to what the future holds in the way of business. Local improvement projects are taking shape in Chicago, but it will be some time before bids are taken. The railroads are placing small tonnages in uncommonly large number for this time of the year. Much of this work is for minor improvements and for bridge alterations and repairs. No announcements have been made of budgets for bridge work in 1930.

Among prospective tonnages in Chicago is 6000 tons for the Lane Technical High School. Total awards this week do not exceed 2000 tons.

Prices are steady at 1.95c. a lb. in tonnage lots.

**Cold-Rolled Strip.**—Producers have opened second quarter books at present quotations. Specifications are spotty, and output is not above 40 per cent of capacity.

**Bolts, Nuts and Rivets.**—Little is taking place in this market except the signing of contracts for second quarter. Discounts are unchanged.

**Old Material.**—The Chicago scrap iron and steel market continues in the listless manner of the past two weeks. Prices for many grades are off 25c. to 50c. a ton, and quotations still lean to the weak side.

A large consumer of hydraulic bundled sheets has taken a round tonnage of the factory grade at \$12.50 a gross ton, delivered, this price being 25c. a ton below the last tonnage sale. Heavy melting steel, as gaged by several small-lot sales, is holding at \$13.75 a gross ton. Dealers have lowered their

bidding prices for this grade, nevertheless incoming tonnages are of ample size to cover users' immediate needs.

The current rate of output by local mills is resulting in larger shipments of heavy melting steel to consuming points and inspections are correspondingly less rigid. A tonnage of cast iron borings has moved to a consumer at \$10 a gross ton, delivered, and brokers are trading in this grade at \$9.25 to \$9.50 a ton. Iron arch bars have declined to \$17 a ton, and rolled steel wheels are off 75c. a ton in a quiet market. Small users are extremely cautious and will make commitments only for short periods.

Dealers acknowledge that the market lacks strength and that prices may slip to lower levels before a turn for the better can be expected. Most sellers find the outlook so uncertain that they prefer to sell rather than stand and wait for a possible strengthening in prices.

Railroad offerings are unusually large. The Pennsylvania will sell 45,000 tons and the Rock Island offers 6000 tons. A motor car manufacturer is making an offering of briquetted cast iron borings.

#### Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$13.25 to \$13.75
Shoveling steel.....	13.25 to 13.75
Frogs, switches and guards, cut apart, and misc. rails	14.00 to 14.50
Hydraulic compressed sheets	12.00 to 12.50
Drop forge flashings.....	9.75 to 10.25
No. 1 busheling.....	11.00 to 11.50
Forg'd cast and r'l'd steel carwheels.....	17.50 to 18.00
Railroad tires, charg. box size.....	17.50 to 18.00
Railroad leaf springs cut apart.....	17.50 to 18.00

#### Acid Open-Hearth Grades:

Steel couplers and knuckles	16.00 to 16.50
Coll springs.....	18.00 to 18.50

#### Electric Furnace Grades:

Axle turnings.....	12.50 to 13.00
Low phos. punchings.....	15.25 to 15.75
Low phos. plates, 12 in. and under.....	15.00 to 15.50

#### Blast Furnace Grades:

Axle turnings.....	10.50 to 11.00
Cast iron borings.....	9.50 to 10.00
Short shoveling turnings.....	9.50 to 10.00
Machine shop turnings.....	7.50 to 8.00

#### Rolling Mill Grades:

Iron rails.....	14.00 to 14.50
Reshaping rails.....	15.00 to 15.50

#### Cupola Grades:

Steel rails less than 3 ft.	17.00 to 17.50
Steel rails less than 2 ft.	18.50 to 19.00
Angle bars, steel.....	15.50 to 16.00
Cast iron carwheels.....	14.75 to 15.25

#### Malleable Grades:

Railroad.....	16.75 to 17.25
Agricultural.....	15.00 to 15.50

#### Miscellaneous:

*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

#### Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	14.50 to 15.00
Iron arch bars and transoms	16.50 to 17.00
Iron car axles	25.00 to 25.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.75 to 12.25
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.25 to 7.75
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	9.25 to 9.75

#### Cupola Grades:

No. 1 machinery cast	13.75 to 14.25
No. 1 railroad cast	13.25 to 13.75
No. 1 agricultural cast	11.75 to 12.25
Stove plate	11.00 to 11.50
Grate bars	11.00 to 11.50
Brake shoes	11.00 to 11.50

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

**Reinforcing Bars.**—This week marks a favorable departure from the character of business during many past weeks. New awards call for more than 900 tons of reinforcing bars, including 450 tons for an apartment building, the first contract of the kind that has been let in Chicago since last fall.

Probably the most interesting project from the viewpoint of tonnage of bars needed is the development of the outer drive at Chicago. A large sum of money is now available for this work, and it is reported that contracts will soon be let for preliminary work such as depressing streets at points of intersection with the new drive. Roadwork still holds an important place in this market because of round tonnages to be let soon by the State of Illinois.

## Detroit Scrap Output Small, Prices Steady

DETROIT, March 11.—There have been few changes in prices on old material in the district during the past week. The small tonnage being produced tends to hold prices steady.

*Dealers' buying prices per gross ton, f.o.b. cars, Detroit:*

Hvy. melting and shov.	\$12.00 to \$12.50
Borings and short turnings	8.50 to 9.00
Long turnings	7.25 to 7.75
No. 1 machinery cast	11.00 to 11.50
Automotive cast	13.00 to 13.50
Hydraul. comp. sheets	11.25 to 11.75
Stove plate	9.00 to 9.50
New No. 1 busheling	11.00 to 11.50
Old No. 1 busheling	8.75 to 9.25
Sheet clippings	9.00 to 9.50
Flashings	11.00 to 11.50

## American Steel & Wire Co. Orders Billet Mill

In carrying out the extension program at its Donora, Pa., works, the American Steel & Wire Co. has placed a contract with the Aetna-Standard Engineering Co., Youngstown, for a continuous billet mill, which will consist of six 24-in. stands and four 18-in. stands. These will serve two continuous rod mill's, contract for which will be placed shortly. Additional rod mills will probably be added later.

## Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinfor'g bars, billet steel—	
Under 5 tons	2.85c.
5 tons to 30 tons	2.45c.
30 tons and over	2.00c.
Rail steel reinforcement	1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (1/8 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, 1/8 in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.90c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	\$2.85 to 2.95
Cement ct'd nails, base per keg	2.35 to 2.95

## New York

### Pig Iron Sales, at 10,000 Tons, Partly Due to "Bargain" Prices—Steel Demand Steady

**N**EW YORK, March 11.—Recent increase in activity in the New England pig iron market has spread to some extent to this district. Sales in the past week totaled 10,000 tons, compared with 5500 tons a week ago, and pending business aggregates 5000 tons. The growth in demand is due in part to the desire of melters to take advantage of current "bargain" prices, but it also indicates a greater degree of confidence in the future. Shipments are holding up well and in some cases are expanding.

The market is still highly competitive, with the approaching opening of canal navigation introducing barge delivery from Buffalo as a factor influencing purchases. Fair quantities of Alabama iron for shipment by rail and water continue to be sold. Foreign pig iron is not competitive on a price basis but is bought from time to time for mixture purposes. Dutch foundry iron is quoted at \$22.75, duty paid port of entry, for No. 1X and lower silicon grades.

The Crane Co., Bridgeport, Conn., is understood to have closed on a round tonnage of iron and another Connecticut melter has bought 400 tons of No. 1X. The A. P. Smith Mfg. Co., East Orange, N. J., is in the market for 150 tons each of No. 2 plain and No. 2X for April, May and June delivery. The Whitin Machine Works, Whitinsville, Mass., is reported to have purchased 2000 tons of foundry iron. The Universal Winding Co., Providence, R. I., has bought 1000 tons.

*Prices per gross ton, delivered New York district:*  
Buffalo No. 2 fdy., sil. 1.75  
to 2.25 ..... \$20.91 to \$21.41  
\*Buff. No. 2, del'd east.  
N. J. ..... 19.28 to 19.78  
East. Pa. No. 2 fdy., sil. 1.75 to 2.25 ..... 19.39 to 21.02  
East. Pa. No. 2X fdy., sil. 2.25 to 2.75 ..... 19.89 to 21.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.  
\*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

**Coke.**—Standard furnace coke prices are still weak and distress carloads are available at \$2.50 to \$2.60 a net ton, Connellsville. Special brands of beehive foundry coke are unchanged at \$4.85 a net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark and \$9.44 to New York and Brooklyn. By-product foundry coke is quoted at \$9 to \$9.40, Newark or Jersey City; 10.06, New York or Brooklyn.

**Warehouse Business.**—Buying from stock continues limited, but prices are fairly well maintained, except for some tendency to shade galvanized sheets, which have been quoted down to 4.25c. a lb., base. Blue annealed sheets are showing slightly more stability at the recently announced price of 3.60c. a lb., base, for No. 10 gage.

**Cast Iron Pipe.**—Pressure pipe prices are strong and show a tendency to advance, although present buying is generally limited to small tonnages. An exception is 6000 tons of water pipe for New York, bids on which were opened today. Catskill, N. Y., is reported to have placed 3000 tons of 16-in. water pipe with R. D. Wood & Co. Montclair, N. J., is inquiring for 100 tons of water pipe.

*Prices per net ton deliv'd New York:*  
Water pipe, 6-in. and larger, \$38.60 to \$39.60; 4-in. and 5-in., \$41.60 to \$42.60; 3-in., \$48.60 to \$49.60. Class A and gas pipe, \$3 extra.

**Ferroalloys.**—There are inquiries for spiegeleisen involving about 200 tons and those for ferromanganese are limited to carload and small lots. Sales of both ferroalloys in the past week have been in small lots for early delivery at unchanged prices.

**Reinforcing Bars.**—Inquiries have been light in the metropolitan district. A contract was let for 600 tons for a foundation of a telephone building in Brooklyn. Prices remain at 1.85c. for mill lengths and 2.10c. for carload lots cut to length, Pittsburgh.

**Finished Steel.**—The best that can be said of the local steel situation is that the volume of business is steady, though the expected acceleration of demand because of seasonal expansion of activities is scarcely noticeable. Prices on the ordinary run of business are holding fairly well, but on the larger projects concessions are being quite freely granted. Even on pipe, which is ordinarily quite steady in price, some irregularities are reported. Price uncertainty comes at a time when some mills, particularly those making sheets, are announcing quotations for the second quarter that represent advances from the current low levels.

Spring building construction projects are developing slowly. A relatively small tonnage has been booked by district fabricators thus far in March and not much is expected. However, plans are being prepared on a good many substantial projects, on which awards are not expected until late in the second quarter. February bookings of structural steel in the metropolitan district were about 38,000 tons, slightly less than the January total, but about 10,000 tons above that of February, 1929. The week's awards include 7700 tons for subway work.

The Seaboard Air Line has ordered 2000 steel box cars, but otherwise railroad equipment business either active or in prospect is not impressive.

*Mill prices per lb., deliv'd New York:* Soft steel bars, 2.19c.; plates, 2.07½c. to 2.12½c.; structural shapes, 2.04½c. to 2.09½c.

**Old Material.**—Brokers are quoting \$15 a ton, delivered, for No. 1 heavy melting steel at Coatesville, Pa., where a contract at \$15.50 is being filled. This has necessitated payment of \$15 a ton, delivered, on considerable tonnage for a Claymont, Del., consumer, which contracted at \$15 a ton, delivered, but brokers have been able to buy some No. 1 steel for this delivery at \$14.75 a ton, delivered. Other

### Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal. 7.00c. to 7.25c.	
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard.....	5.05c.
Hoops.....	4.25c.
Bands.....	3.75c.
Blue ann'l'd sheets (No. 10).....	3.60c.
Long terne sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, $\frac{1}{2} \times \frac{1}{4}$ in. and larger.....	3.40c.
Smooth finish, 1 to $2\frac{1}{2} \times \frac{1}{4}$ in. and larger.....	3.75c.
Open-hearth spring steel, bases.....	
4.50c. to 7.00c.	

	Per Cent
Machine bolts, cut threads: Off List	
$\frac{1}{2} \times 6$ in. and smaller.....	60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
$\frac{1}{2} \times 6$ in. and smaller.....	60
$\frac{1}{2} \times 20$ in. and smaller.....	50 to 50 and 10
Coach Screws:	
$\frac{1}{2} \times 6$ in. and smaller.....	60
1 x 6 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$19.00
Seamless steel, 2-in.....	20.25
Charcoal iron, 2-in.....	26.25
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe		
Standard Steel—	Black	Galv.
1/2-in. butt.....	46	29
3/4-in. butt.....	51	37
1-3-in. butt.....	53	39
2 1/2-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12

Wrought Iron—		
1/2-in. butt.....	5	+19
3/4-in. butt.....	11	+9
1-1 1/2-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)	Prime	Seconds
Coke, 100 lb. base box.....	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC .....	\$9.70	\$12.10
IX .....	12.00	14.25
IXX .....	13.90	16.00

Terne Plate (14 x 20 in.)		
IC—20-lb. coating.....	\$10.00	to \$11.00
IC—30-lb. coating.....	12.00	to 13.00
IC—40-lb. coating.....	13.75	to 14.25

Sheets, Box Annealed—Black, C. R.		
One Pass		
Nos. 18 to 20.....	3.60c.	to 3.70c.
No. 22.....	3.75c.	to 3.85c.
No. 24.....	3.90c.	to 3.90c.
No. 26.....	3.90c.	to 4.00c.
No. 28*.....	4.05c.	to 4.15c.
No. 30.....	4.30c.	to 4.40c.

Sheets, Galvanized		
No. 14.....	3.90c.	to 4.00c.
No. 16.....	3.75c.	to 3.85c.
No. 18.....	3.90c.	to 4.00c.
No. 20.....	4.00c.	to 4.10c.
No. 22.....	4.10c.	to 4.20c.
No. 24*.....	4.25c.	to 4.35c.
No. 26.....	4.50c.	to 4.60c.
No. 28*.....	4.75c.	to 4.85c.
No. 30.....	5.15c.	to 5.25c.

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

†For 50 bundles or more, 25c. per 100 lb. or less.

grades of scrap are inactive, and prices substantially unchanged.

*Dealers' buying prices per gross ton, f.o.b.*

*New York:*

No. 1 heavy melting steel.	\$11.00 to \$11.50
Heavy melting steel (yard)	\$7.75 to 8.50
No. 1 hvy. breakable cast.	10.00 to 10.50
Stove plate (steel works).	8.00
Locomotive grate bars...	8.25
Machine shop turnings...	7.00 to 7.50
Short shoveling turnings.	7.25 to 7.50
Cast borings (blast fur. or steel works)....	7.00 to 7.50
Mixed borings and turnings .....	6.75 to 7.50
Steel car axles.....	16.75 to 17.75

Iron car axles.....	20.50 to 21.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.75
Forge fire .....	8.50 to 9.00
No. 1 railroad wrought...	11.50 to 12.00
No. 1 yard wrought, long.	10.50 to 11.50
Rails for rolling.	10.50 to 11.00
Stove plate (foundry)...	8.75 to 9.00
Malleable cast (railroad)...	12.00 to 12.50
Cast borings (chemical)...	9.50 to 10.00
Prices per gross ton, deliv'd local foundries:	
No. 1 machry. cast.....	\$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	13.00
No. 2 cast (radiators, cast boilers, etc.) .....	12.50

## Cleveland

### Ingot Output and Sheet Mill Operations Further Reduced —Automotive Demands Still Restricted

**C**LEVELAND, March 11.—The volume of business in finished steel showed little change during the week as compared with previous few weeks. However, there has been further reduction in ingot production by local mills and in operation of sheet mills in the northern Ohio territory. Two Cleveland plants each have shut down an open-hearth furnace, and a third has put on an additional furnace. At present, 17 open-hearth furnaces are being operated by independent companies here, or a little more than 60 per cent of capacity. Two Valley district sheet mill plants were shut down this week. With virtually no backlog, some of the sheet mills are very irregular in their operations.

The restricted demand is due in a large measure to the light volume of business from the automotive industry. While some of the automobile manufacturers in the Michigan territory are maintaining recent production schedules, others have further curtailed, so that on the whole the industry still shows a downward tendency and an improvement in production schedules is not looked for until spring weather stimulates dealers' sales.

A Cleveland body building plant increased its releases of sheets during the week and there is a little pick-up in specifications for bars from some of the local forging shops. However, some of the stamping plants suspended shipments of steel because of the holding up of orders for stampings by automobile manufacturers.

**Bars, Plates and Shapes.**—Demand for heavy rolled steel products is holding at the recent volume. Some of the mills have announced their willingness to take second quarter contracts at the ruling prices, but are not actively seeking contracts. The present alloy steel price of 2.65c., base, has been reaffirmed for the second quarter by one mill and others are expected to fall in line.

Structural steel inquiry continues light in this territory, although several good jobs are pending. Low prices are being named for fabricated work. Bids are being taken on 1150 tons of sheet steel piling for construction of Government jetties at Erie, Pa.

Steel bars are stabilized at 1.85c., Cleveland, and plates are holding at 1.85c., Pittsburgh, on most business, although some large-lot buyers are able to get 1.80c.

**Pig Iron.**—The market shows virtually no change. Cleveland interests sold 20,000 tons of foundry and malleable iron during the week, or about the same tonnage as during the previous week. Shipments are spotty, but show little change in the aggregate from the latter part of February. The motor car industry continues to take iron in restricted quantities.

sent out an inquiry for 330,000 tons, as compared with its last year's inquiry of 354,000 tons. This company's inquiry indicates considerable change in its ore requirements. This year it is asking for 40,000 tons of basic ore, as compared with 200,000 tons a year ago, and 50,000 tons of manganeseiferous ore, as against 77,000 tons a year ago. It has increased its inquiry for high phosphorus ore, asking for 85,000 tons, as against 44,000 tons last year, and also for siliceous ore, for which it is inquiring for 55,000 tons, as against 33,000 tons last year.

Ore on dock March 1 was 5,535,835 tons, as against 4,939,417 tons on the same date last year. February shipments from docks were 319,663 tons, as against 376,786 tons during February last year.

**Semi-Finished Steel.**—Orders show a slightly further falling off, particularly for sheet bars, and the leading local producer has taken off another open-hearth furnace. No interest is being shown in second quarter contracts, nor is there any current demand. Quotations are unchanged at \$33, Cleveland and Youngstown, for sheet bars, billets and slabs, and it is expected that these prices will be re-established for the second quarter.

**Strip Steel.**—Specifications and new business in hot-rolled strip are very light. While present prices of 1.80c., Pittsburgh, for wide strip and 1.90c. for narrow have been named for the second quarter, consumers are taking no interest in new contracts either for the hot-rolled material or cold-rolled strip, for which some of the mills have opened their books at the present 2.65c., Cleveland, price for the coming quarter. There is some activity in cold-rolled material in car lots, which are bringing the regular price, although there has been some shading recently on larger lots.

**Coke.**—New demand for foundry coke is light and specifications against contracts are moderate. Business in domestic heating coke is about over for the season. Prices are stabilized, with by-product foundry coke quoted at \$8.25, Ohio ovens.

**Fluorspar.**—With reduced steel plant operations, consumers still have good stocks and no new contracts are being closed. There is an occasional small lot sale at \$18 for gravel fluo-

*Prices per gross ton at Cleveland:*

N'th'n fdv., all. 1.75 to 2.25	\$19.50
S'th'n fdv., all. 1.75 to 2.25	19.51
Malleable .....	19.50
Ohio silvery, 8 per cent..	28.00
Basic Valley furnace....	18.50
Stand. low phos. Valley...	\$26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

**Iron Ore.**—Consumers are beginning to show some interest in their ore requirements for the coming season, although it may be several weeks before prices are established and buying starts, as meltters are not in need of early cargoes. Nothing has developed to indicate that last season's prices will not be reestablished.

The Ford Motor Co., which usually is the first to enter the market, has

**Warehouse Prices, f.o.b. Cleveland**

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq. ....	4.15c.
Hoops and bands, No. 12 to $\frac{1}{4}$ in., inclusive .....	3.25c.
Hoops and bands, No. 18 and lighter .....	3.65c.
Cold-finished strip.....	*5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.50c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.75
No. 9 galv. wire, per 100 lb.....	3.20
Com. wire nails, base per kg.....	2.65

\*Net base, including boxing and cutting to length.

spar, the market apparently being firm at that price.

**Bolts, Nuts and Rivets.**—Bolt and nut manufacturers have reestablished for the second quarter the present discount of 70 per cent on bolts and nuts and reaffirmed the present prices on stove bolts. Business continues in about recent volume. Orders are fair from railroads, agricultural implement manufacturers, makers of road building machinery and jobbers, but light from the automotive industry. Rivet business is still rather light. While the present prices have been reaffirmed, makers as yet have not started to make second quarter contracts.

**Sheets.**—Demand continues slow from all consuming industries. Some additional producers have announced second quarter prices, naming advances to 2.75c. for black and 4c. for metal furniture sheets and the present prices of 2.10c. and 2.25c. for Nos. 10 and 13 blue annealed, and 3.90c. for auto body sheets.

While business is not coming out in large enough lots to test prices, the market appears to be well stabilized at the prices that have prevailed recently. The ruling price on black sheets is 2.65c. and on galvanized 3.30c. Metal furniture sheets range from 3.90c. to 4c.

**Reinforcing Bars.**—The Bourne-Fulmer Co. has taken 1100 tons for the Erie, Pa., filtration plant. Several jobs involving 250 tons or less are still pending, but no new inquiry for lots of size came out during the week.

**Wire Products.**—While nails appear well maintained at \$2.30 per keg to jobbers, dealers are also able to buy car lots at that price. Some of the mills are naming \$2.30 to \$2.40 per keg for nails and 2.40c. a lb. for wire for the second quarter, but buyers are showing no interest in new contracts. Demand is not active.

**Cold-Finished Steel Bars.**—Some makers have opened their books for the second quarter at the present 2.10c., Cleveland, price. Specifications are still slow.

**Warehouse Business.**—Effective Wednesday, Cleveland jobbers have announced quantity differentials on warehouse shipments of hot-rolled products as follows: 399 lb. and under, extra is 50c. per 100 lb. over base; 400 to 3999 lb., base price; 4000 to 8000 lb., 15c. below base; 8000 to 15,000 lb., 25c. below base; 15,000 lb. and over, 35c. per 100 lb. below base.

**Old Material.**—The market has a weaker tone, but there is not enough business to test prices. Cleveland mills are taking scrap at the recent reduced rate, but some of the other northern Ohio consumers further curtailed shipments during the week. Because of restricted shipments, buying by dealers having contracts is almost at a standstill.

*Prices per gross ton delivered consumers' yards:*

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	\$14.00 to \$14.25	
No. 2 heavy melting steel	13.25 to 13.50	
Compressed sheet steel	13.00 to 13.25	
Light bunched sheet stampings	11.50 to 12.00	
Drop forge flashings	11.50 to 11.75	
Machine shop turnings	10.25 to 10.75	
Short shoveling turnings	11.25 to 11.75	
No. 1 railroad wrought	13.00 to 13.50	
No. 2 railroad wrought	14.00 to 14.50	
No. 1 busheling	12.00 to 12.50	
Pipes and flues	9.00 to 9.50	
Steel axle turnings	12.50 to 13.00	

Acid Open-Hearth Grades:		
Low phos., forging crops	17.75 to 18.00	
Low phos., billet bloom and slab crops	18.50 to 18.75	
Low phos., sheet bar crops	18.00 to 18.50	
Low phos., plate scrap	18.00 to 18.50	

Blast Furnace Grades:		
Cast iron borings	10.50 to 11.00	
Mixed borings and short turnings	10.50 to 11.00	
No. 2 busheling	10.00 to 10.50	
Cupola Grades:		
No. 1 cast	15.25 to 15.75	
Railroad grate bars	11.00 to 12.00	
Stove plate	12.00 to 12.50	
Rails under 3 ft.	18.50 to 19.50	
Miscellaneous:		
Rails for rolling	16.25 to 16.50	
Railroad malleable	16.00 to 16.50	

## Philadelphia

### Steel Buying Limited but Prices Are Fairly Well Maintained—Pig Iron Prices Lack Strength

**PHILADELPHIA**, March 11.—Steel business in the past week has again been small, and operating rates of mills show a further slight recession. Meanwhile, prices are generally being maintained, with only occasional concessions on large and desirable orders. Despite insufficient business at present, mills see prospect of improvement later in the spring, based on projected ship construction for new ocean mail routes, railroad requirements, and building projects on which financing has not yet been completed.

A low bidder on a Government mail carrying contract, the Colombian Steamship Co., New York, is asking for bids on three vessels to cost about \$6,000,000. The Pennsylvania Railroad will open bids March 21 on 6000 kegs of spikes and 755 tons of black, galvanized and blue annealed sheets for second quarter. The Sun Oil Co. is expected to close shortly on upward of 20,000 tons of 6-in. steel pipe for a line from Marcus Hook on the Delaware River to Cleveland.

**Pig Iron.**—Eastern Pennsylvania foundry iron prices are lacking in strength, with producers forced to grant concessions on desirable orders to meet competition from Southern

furnaces. While \$20 a ton is still occasionally obtained on a carload lot of iron, \$19.50 is more representative of the market and even this price is sometimes subject to shading. The

Baldwin Locomotive Works, Eddystone, Pa., is reported to have placed 1500 tons of floor iron with a Southern furnace.

Although no sales of basic iron have been made in recent weeks, it is generally conceded that the delivered price today ranges from \$19 to \$19.50 a ton, depending upon the freight rate to the consumer's plant. Demand for low phosphorus iron continues fair, and one local furnace is remaining in blast on contracts for this grade, despite a substantial accumulation of foundry iron on its yard.

*Prices per gross ton at Philadelphia:*

East. Pa. No. 2, 1.75 to 2.25 sil.	\$20.26 to \$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.76 to 21.26
East. Pa. No. 1X	21.26 to 21.76
Basic (del'd east. Pa.)	19.00 to 19.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

**Bars.**—Buying is limited, and the price has settled to 1.85c. a lb., Pittsburgh, or 2.17c. per lb., delivered Philadelphia, even when a small order or miscellaneous specification is placed.

**Reinforcing Bars.**—About 700 tons of bars for a high school at Thirty-third and Tasker Streets, Philadelphia, is reported to have been placed with the Kalman Steel Co. Current reinforced concrete projects, as a rule, require less than 100 tons of bars. Competition for business is keen, and prices range from 1.90c. to 1.95c., Pittsburgh, or 2.22c. to 2.27c., Philadelphia, for billet steel bars. Rail steel bars are quoted at about 1.75c., Franklin, Pa., and Tonawanda, N. Y., or 2.07c., delivered Philadelphia.

**Shapes.**—Quotations have settled to 1.80c. a lb., f.o.b. nearest mill to consumer, or 1.86c., delivered Philadelphia, with 1.85c., mill, or 1.91c., delivered Philadelphia, only occasionally obtained on a small lot. Preferred buyers are granted slight concessions from the lower quotation. Local fabricators are in need of orders and are bidding on a considerably smaller total of new business than is usual at this season.

**Plates.**—The small tonnage of plate business being placed with mills at present is at 1.90c. a lb., Coatesville, Pa., or 2c., delivered Philadelphia, 1.95c., Coatesville, or 2.15c., Philadelphia, seldom applying even on the smaller lots. Despite the lack of buying in the past fortnight, mills are still maintaining fair operating rates, which have only slightly receded from about 65 per cent.

**Sheets.**—Consumers in this district are only moderately active, and, with buying decidedly limited, the firmness of present quotations is difficult to

determine. Mills are asking 2.75c. a lb., Pittsburgh, or 3.07c., Philadelphia, for second quarter delivery of black sheets, but consumers have exhibited no interest in forward purchases. The current price is 2.65c., Pittsburgh, or 2.97c., Philadelphia. Galvanized sheets are unchanged at 3.30c., Pittsburgh, or 3.62c., delivered Philadelphia. Blue annealed sheets are quoted at 2.25c., Pittsburgh, or 2.57c., delivered Philadelphia, for No. 13 gage and blue annealed plates are 2.10c., Pittsburgh, or 2.42c., delivered Philadelphia, for No. 10 gage. These prices are shaded occasionally on large blue annealed sheet orders where competition is encountered from the product of the continuous mill.

**Imports.**—In the week ended March 8, a total of 2199 tons of pig iron was received from British India, 1550 tons of chrome ore from Portuguese Africa and 100 tons from British South Africa, 168 tons of spiegeleisen and 35 tons of ferromanganese from the United Kingdom. Steel arrivals consisted of 82 tons of structural shapes from Germany and 59 tons from Belgium, 22 tons of steel bars from France, 20 tons from Germany and 25 tons from Belgium, four tons of iron sheets from Sweden, and five tons of steel scrap from the United Kingdom.

**Old Material.**—No further No. 1 heavy melting steel contracts have been made since a Claymont, Del., mill paid \$15 a ton, and a Coatesville, Pa., consumer \$15.50 a ton, delivered, but brokers are beginning to show increased willingness to consider small tonnage orders at less than \$15 a ton, delivered. Users of No. 2 steel are showing some interest in buying, but other grades of scrap are quiet.

<i>Prices per gross ton delivered consumers' yards; Philadelphia district:</i>		
No. 1 heavy melting steel.	\$15.00 to \$15.50	
Scrap T rails.....	14.50	
No. 2 heavy melting steel..	11.50 to 13.00	
No. 1 railroad wrought..	15.00 to 15.50	
Bundled sheets (for steel works) .....	11.50	
Hydraulic compressed, new	13.50 to 14.50	
Hydraulic compressed, old.	12.00 to 13.00	
Machine shop turnings (for steel works).....	11.50	
Heavy axle turnings (or equiv.) .....	12.50 to 13.50	
Cast borings (for steel works and roll. mill)...	11.25	
Heavy breakable cast (for steel works).....	14.00	
Railroad grate bars.....	11.50 to 12.50	
Stove plate (for steel works) .....	11.50 to 12.50	
No. 1 low phos. hvy. 0.04% and under.....	20.50 to 21.50	
Couplers and knuckles.....	19.00 to 19.50	
Rolled steel wheels.....	19.00 to 19.50	
No. 1 blast f'nace scrap..	10.50 to 11.00	
Wrot iron and soft steel pipes and tubes (new specific) .....	14.00	
Shafting .....	19.00	
Steel axles.....	21.00 to 21.50	
No. 1 forge fire.....	13.00 to 13.50	
Cast iron carwheels.....	15.00	
No. 1 cast.....	15.00 to 15.50	
Cast borings (for chem. plant) .....	14.00	
Steel rails for rolling.....	15.00 to 15.50	

CHICAGO, 150 tons, Holden School, to Eggers-Schillo Co., local.

EAST CHICAGO, IND., 850 tons, bridge, to Wisconsin Bridge Co.

MEXICO, 400 tons, power house for Phoenix Utility Co., to Kansas City Structural Steel Co.

BERKELEY, CAL., 100 tons, assembling building for the Bryon Jackson Co., to Austin Co.

OAKLAND, CAL., 368 tons, plates, 20 and 24-in. welded steel pipe, East Bay Municipal Utility District, to Steel Tank & Pipe Co.

SAN DIEGO, CAL., 350 tons, shop for Naval air station, to Judson-Pacific Co.

VERNON, CAL., 100 tons, plant addition, Pacific Coast Steel Corporation, to Consolidated Steel Corporation.

### Structural Projects Pending

Inquiries for fabricated steel work include the following:

HOLTON, ME., 120 tons, hotel.

PRESQUE ISLE, ME., 125 tons, hotel.

BEDFORD, MASS., 300 tons, hospital units. CAMBRIDGE, MASS., 275 tons, power house, Harvard University.

NEW YORK, 500 tons, vocational building for College of the City of New York.

NEW YORK, 2000 tons, school No. 98, Boston Road and 173rd Street, originally reported as 1400 tons.

BROOKLYN, N. Y., 8000 tons, Central Court building, Schermerhorn and State Streets.

STATE OF NEW JERSEY, 213 tons, two highway bridges; Atlantic Construction Co., low bidder for general contract.

BRENTWOOD, N. Y., unstated tonnage, 27 small buildings for Pilgrim Hospital.

WASHINGTON, 3000 tons, extension to Department of Agriculture Building.

ERIE, PA., 760 tons, theater for Warner Brothers.

ERIE, 600 tons, grade crossing elimination.

ERIE, 1500 tons, Erie Arms apartment building.

CHARLESTON, W. VA., 3300 tons, State Capitol; Wheeling Structural Steel Co., low bidder.

MILWAUKEE, 4000 tons, addition to Northwestern Mutual Life Building; bids extended from March 17 to March 31. (Note—Steel included in general contract tenders.)

MILWAUKEE, 2000 tons, addition to post office; bids extended from March 5 to March 20. (Note—This also is a general contract proposition.)

WISCONSIN RAPIDS, WIS., 370 tons, Marathon City, bridge; bids close with State Highway Commission March 20.

STATE OF MINNESOTA, 400 tons, highway bridges.

SUGAR CREEK, MO., 750 tons, power house for Standard Oil Co.

OKLAHOMA CITY, 800 tons, viaduct.

TACOMA, WASH., 1175 tons, plates, 44-in. riveted steel pipe line; contract awarded on basis of reinforced concrete pipe.

EVERETT, WASH., 200 tons, Sauk River bridge; general contract to General Construction Co.

OAKLAND, CAL., 200 tons, transit shed, Ninth Avenue Pier; bids March 11.

Youngstown Pressed Steel Co. of Warren, Ohio, a subsidiary of the Sharon Steel Hoop Co., Sharon, Pa., has sold its fireproofing division to the United States Gypsum Co., Chicago, it was announced Tuesday by President W. W. Galbreath, of the Warren company.

## Fabricated Structural Steel

### Awards of Only 22,000 Tons and New Projects Requiring 20,000 Tons Place Week Among Smallest This Year

**A**WARDS of structural steel totaling about 22,000 tons and new projects of about 20,000 tons made the past week one of the smallest of the year. Awards included 7700 tons for subway construction in Brooklyn, 1500 tons for Norfolk & Western Railroad bridges and 1260 tons for the Union Terminal Building in Cincinnati. New projects were as a rule small, the principal exceptions being a Court House in Brooklyn, requiring 8000 tons, and an extension to the Agricultural Building in Washington, calling for 3000 tons. Awards follow:

LEBANON, N. H., 200 tons, State bridge, to Albany Bridge Co.

BROOKLYN, 7700 tons, subway, route 110, section 4, to American Bridge Co.

NEW YORK, 800 tons, school No. 156, Laurelton, L. I., and No. 198, Brooklyn, 400 tons each, to Easton Structural Steel Co.

NEW YORK, 400 tons, apartment building at 433 West Twenty-first Street, to George A. Just Co.

NEW YORK, 400 tons, Warner Brothers building on West Fifty-fourth Street, to Levering & Garrigues Co.

ROCHESTER, N. Y., 350 tons, bridge over Genesee River, to Lackawanna Steel Construction Co. (Reported.)

PHILADELPHIA, 250 tons, building at Fifth and Walnut Streets for Mechanics Insurance Co., to Bethlehem Fabricators, Inc.

SPRING GROVE, PA., 600 tons, P. H. Glatfelter Co. addition to paper mills, to Shoemaker Bridge Co.

NORRISTOWN, PA., 100 tons, Wildman Mfg. Co., to Austin Co.

ROCHESTER, PA., 500 tons, four sand and gravel barges for West Penn Sand & Gravel Co., to Midland Barge Co.

EAST PITTSBURGH, 370 tons, welded tank

shop for Westinghouse Electric & Mfg. Co., to Jones & Laughlin Steel Corporation.

BETHLEHEM, PA., 1000 tons, skip coke bins and cast house for Bethlehem Steel Co., to McClinton-Marshall Co.

BALTIMORE, 400 tons, Consolidated Gas Co. building, to Belmont Iron Works.

WASHINGTON, 700 tons, building for Potomac Electric Co., to American Bridge Co.

NORFOLK & WESTERN RAILROAD, 1500 tons, bridges, to Virginia Bridge & Iron Co.

MONROE, MICH., 450 tons, factory for Consolidated Paper Co., to Flint Structural Steel Co.

DETROIT, 1000 tons, Union League Club, to Whitehead & Kales Co.

TOLEDO, 520 tons, Toledo University, to American Bridge Co.

CLEVELAND, 380 tons, Nickel Plate bridge at East Ninety-third Street, to American Bridge Co.

CLEVELAND, 378 tons, addition for Chain Products Co., to Massillon Structural Steel Co.

CINCINNATI, 1260 tons, Union Terminal building, to Mount Vernon Bridge Co.

CHICAGO, 280 tons, Peck School, to Butler Street Foundry, local.

## Pacific Coast

### Demand for Steel Products Has Eased Off—Building Permits Below Last Year's Volume

SAN FRANCISCO, March 8 (*By Air Mail*).—Demand for iron and steel products has fallen off during the past 10 days, and new inquiries and awards were limited to a few large projects. Excessively heavy rains lately have had a hampering effect on business generally.

Among the larger awards reported were 350 tons for a shop building for the naval air station, San Diego, placed with the Judson-Pacific Co. and 1545 tons of cast iron pipe for Glendale, Cal., booked by the National Cast Iron Pipe Co.

Building permits issued in the larger cities on the Pacific Coast during February were below the total for the same month last year.

**Pig Iron.**—Trading in foundry iron continues to be confined to unimportant lots for prompt shipment. Prices are unchanged.

*Prices per gross ton at San Francisco:*  
\*Utah basic ..... \$25.00 to \$26.00  
\*Utah fdy., sil. 2.75 to 3.25 ..... 25.00 to 26.00  
\*\*Indian fdy., sil. 2.75 to 3.25 ..... 25.00 to 26.00

\*Delivered San Francisco.

\*\*Duty paid, f.o.b. cars San Francisco.

**Bars.**—While a number of small reinforcing steel bar awards were placed during the week, the only booking in excess of 100 tons was 123 tons for the Keno bridge near Portland, Ore., placed with an unnamed interest. Bids will be opened April 2 on 2500 tons for the Fourth Street bridge, Los Angeles. Other pending work includes 139 tons for highway work in Glenn County, Cal., and 115 tons for three bridges in Kittitas County, Wash. Out-of-stock prices remain unchanged in the San Francisco district at 2.30c., base, for carload lots and at 2.60c. for less than carloads. Prices in the Los Angeles district are \$2 a ton higher. Merchant bar steel continues firm at 2.35c., c.i.f. coast ports. Most of the orders for the latter class of steel involve less than carload lots.

**Plates.**—Fabricators were disappointed in the outcome of the Tacoma pipe line project, for which reinforced concrete pipe will be used. This project, had it gone steel, would have called for 1200 tons. The Steel Tank & Pipe Co. secured 368 tons for a 20

#### Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, $\frac{1}{4}$ -in. and over	3.15c.
Small angles, under $\frac{1}{4}$ -in.	3.55c.
Small channels and tees, $\frac{1}{4}$ -in. to $2\frac{1}{4}$ -in.	3.75c.
Spring steel, $\frac{1}{4}$ -in. and thicker	4.90c.
Black sheets (No. 24)	3.90c.
Blue ann'l'd sheets (No. 10)	5.30c.
Galv. sheets (No. 24)	5.65c.
Struc. rivets, $\frac{1}{4}$ -in. and larger	\$3.40
Com. wire nails, base per keg	3.40
Cement c't'd nails, 100 lb. keg	3.40

in excess of 100 tons were reported this week. In addition to the Glendale tonnage, mentioned above, and involving 6 to 30-in. Classes B, C and 250 pipe, Aberdeen, Wash., placed 209 tons of 2 to 12-in. Classes 150 and 250 pipe with the Pacific States Cast Iron Pipe Co. Tempe, Ariz., placed with an unnamed interest 108 tons of 2 to 6-in. Class 150 pipe. The East Bay Municipal Utility District, Oakland, which had an inquiry out for 350 tons of 20-in. Class B pipe, decided to use welded steel pipe instead. Los Angeles will open bids on March 12 for 762 tons of 6-in. Class 150 pipe and on March 13 for 2562 tons of 4 to 12-in. Class 150 pipe.

**Steel Pipe.**—Demand for standard steel pipe and oil country goods remains light, and no large pipe line inquiries have come up for figures lately. The Crane Co. took 100 tons of lapwelded black pipe for San Gabriel, Cal.

**Cast Iron Pipe.**—Only three awards

## Youngstown

### Valley Mills Believe Lull in Steel Demand Is Temporary—Expect Gains in Second Quarter

YOUNGSTOWN, March 11.—The steel industry in the Valleys is adjusting itself to what is generally spoken of as a temporary lull in demand. Open-hearth operations are considerably lower than they were this time last month, with 65 to 70 per cent of the district's available capacity now active.

Finishing mill schedules have declined most sharply in the sheet and strip departments, with bar mills only slightly curtailed, pipe production generally unchanged and tin plate output at the Warren, Ohio, mill approaching capacity. Nail and wire production is restricted, but beginning to expand in the merchant lines as shipments to jobbers in the South and Southwest increase with the warmer weather. Tubing manufacturers are stocking material, as is to be expected at this time of the year, and this is naturally sustaining a higher output than might be warranted by current demand. Pipe operations average 50 to 60 per cent of capacity.

Steel company executives do not anticipate any marked improvement in specifications before the beginning of the second quarter and are rather cautious in their predictions beyond that date. Dependent as are the Valley mills upon the demands of the automobile industry, reports from Detroit are being watched carefully.

Steel makers generally approve of the reported policy of the automobile manufacturers in regulating their production to consumer demand, as extended over-production of motor cars at this time would likely take their builders out of the market for the greater part of the year. Present curtailed output assured a steady, if restricted, flow of steel to this consuming channel, and there is little likelihood of further interruption. A few Valley sheet mills are shipping a considerable tonnage of sheets and strip to the Ford Motor Co. and this probably accounts for the comparatively high schedules of some mills. But Ford production is not above 65 per cent of ultimate capacity, even though considerably above that of other automobile makers.

Prospects in the building industry are also being watched closely. The largest fabricator of building materials in the district is beginning to increase its requirements, but is taking steel at a lower rate than usual at this time of the year. Makers of galvanized sheets and other sheet steel products which go into new construction have noticed slight improvement in the specifications from the southern part of the country. Furniture sheets are going to office equipment makers at a good rate. Other sheet consuming lines are without feature.

The decline in steel demand has not affected prices adversely, and quotations are somewhat firmer than they were two weeks ago, in the opinion of one large company. This condition may be partially explained by the lack of forward or large tonnage buying, but must be attributed chiefly to the determination of mills to keep their sales on a profitable basis.

Recently announced second quarter quotations on sheets have not been tested, but mills are beginning to negotiate with their customers at the ad-

vanced levels. In the majority of cases sales executives report that buying is not being postponed because of price but on account of undetermined requirements in the spring months. It is expected, however, that a number of producers, particularly the smaller ones, will be willing to take sheet tonnage at the present quoted levels, namely, 2.65c. for black sheets, 3.30c. for galvanized and 2.10c. and 2.25c. for light plates and blue annealed sheets.

Advances of \$2 a ton on second quarter business are being made only on black and galvanized material. Automobile body sheets will remain at 3.90c. and metal furniture at 4c. Prices on wide strips are indefinite, but one maker hopes to maintain them at not less than \$2 a ton under the jobbing mill product and if possible at the same level. The bar price is fairly well established at 1.85c.

Pittsburgh, although Cleveland quotations are still a weakening factor in the Detroit market. Nail makers are announcing a minimum of \$2.30, Pittsburgh, on second quarter tonnage. Wire rods are generally quoted at \$38, Pittsburgh, and billets, slabs and sheet bars at \$33, Youngstown.

The pig iron market is still very dull. Valley furnaces are shipping fair tonnages on contract, but new buying is negligible and consumers show no interest in other than their immediate requirements. Prices are holding on business in the immediate district, but shading has occurred in competitive territory.

Scrap is also less active, as considerable buying took place before the recent decline in ingot operations. Most recent sales of No. 1 heavy melting steel brought \$16 to \$16.50, with hydraulic compressed sheets about 50c. under these figures.

veloping slowly. With conditions as they are, competition among billet bar sellers for business is progressively keener and some shading of prices was done on the small business placed the past week. Considerable road work throughout New England is planned for this spring.

Prices quoted openly on billet bars are: 1 to 5 ton lots, 3.16½c. to 3.26½c. a lb., base f.o.b. metropolitan Boston; 5 to 99 tons, 2.86½c.; 100 tons or more, 2.76½c. Rail steel bars are openly quoted at 2.26½c. a lb., base, delivered Boston common freight rate points.

**Cast Iron Pipe.**—Brockton, Mass., has awarded 1400 tons of 24-in. and 60 tons of 6-in. pipe to R. D. Wood & Co. That foundry was the low bidder on 800 tons of pipe required for Walpole, Mass. Lawrence, Mass., has awarded 100 tons of 4, 6 and 8-in. pipe to the Donaldson Iron Co. The market for 4-in. pipe is \$1 a ton higher at \$47.10 a ton, delivered common Boston freight rate points; 6-in. and larger pipe remains at \$42.10 to \$43.10. A \$4 differential is asked on Class A and gas pipe. Gardner, Mass., requires 2000 ft. of 6-in. pipe.

## Boston

### Many New England Foundries Covered on Pig Iron for Remainder of First Half

**BOSTON,** March 11.—It is assumed by pig iron houses that all of the important New England foundries, with one exception, have covered their prospective first half iron requirements, and that, unless the general melt increases perceptibly during the next two months, purchases will be confined to small lots. An exception is the H. B. Smith Co., Westfield, Mass. This company has been sounding out the market on 5000 to 6000 tons, but the national building outlook is so uncertain it is not yet determined just how much iron will be required.

#### Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	.50 and 5
Carriage bolts	.50 and 5
Lag screws	.50 and 5
Hot-pressed nuts	.50 and 5
Cold-punched nuts	.50 and 5
Stove bolts	.70 and 10

\*Including quantity differentials.

Sales reported the past week approximated 5000 tons, contrasted with about 12,000 tons the previous week, fully two-thirds of the tonnage having been booked by Buffalo furnaces. Included were 1000 tons of No. 1X Buffalo iron to a Massachusetts melter and 500 tons No. 1X Buffalo and 500 tons No. 2X Mystic to the Universal Winding Co., Providence, R. I. Quite a few small tonnages were placed in Connecticut.

Buffalo furnaces are endeavoring to obtain \$16.50 a ton, base furnace, but \$16 has been done on lots of more than 100 tons. One Buffalo stack still offers iron on a rail and water rate, and furnaces east of Buffalo are meeting its delivered prices and in some instances have sold for less.

**Foundry iron prices per gross ton deliv'd to most New England points:**

†Buffalo, sil. 1.75 to 2.25..	\$20.28 to \$20.78
†Buffalo, sil. 2.25 to 2.75..	20.78 to 21.28
*Buffalo, sil. 1.75 to 2.25..	20.91 to 21.41
*Buffalo, sil. 2.25 to 2.75..	21.41 to 21.91
Va., sil. 1.75 to 2.25..	25.21
Va., sil. 2.25 to 2.75..	25.71
*Ala., sil. 1.75 to 2.25..	22.61
*Ala., sil. 2.25 to 2.75..	23.11
†Ala., sil. 1.75 to 2.25..	18.75
†Ala., sil. 2.25 to 2.75..	19.25

**Freight rates:** \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

\*All rail rate.

†Rail and water rate.

**Reinforcing Steel.**—Although call money was as low as 3½ per cent the past week, New England banks generally are overstocked with building paper and are reluctant to commit themselves extensively on additional construction loans. For that reason reinforcing steel tonnages hanging over the market a week ago are still uncovered, and new tonnages are de-

**Old Material.**—A further contraction in old material business and price readjustments by some brokers, who early in the week completed their orders, have had a stabilizing influence on values. In steel turnings, however, an unusually wide spread in prices is still noted. Buying for New York State consumption is still going on in a small way at \$7 a ton, on cars shipping point, but for Pennsylvania delivery prices range down to \$6. The specification pipe market has broken through \$9 a ton on cars, the bulk of recent business having been done at \$8.85. In contrast, textile machinery cast at \$13 a ton, delivered, is virtually cleaned up and \$14 is now the generally lowest quotation. Sales of No. 1 machinery cast at \$15 a ton, delivered, have been common, and at least three car lots are known to have changed hands at \$14.50. No. 1 heavy melting steel is in such light demand it is rather difficult to establish a market.

#### Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$10.50 to \$10.60
Scrap T rails .....	10.00 to 10.25
Scrap girder rails.....	9.25 to 9.50
No. 1 railroad wrought..	10.50 to 11.00
Machine shop turnings...	6.00 to 7.00
Cast iron borings (steel works and rolling mill)	6.25 to 6.60
Bundled skeleton, long...	9.00 to 9.50
Forge flashings .....	9.00 to 9.25
Blast furnace borings and turnings .....	5.50 to 6.00
Forge scrap .....	8.50 to 9.00
Shafting .....	14.00 to 15.00
Steel car axles .....	16.50 to 17.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	8.85 to 9.10
Rails for rolling .....	11.00 to 11.50
Cast iron borings, chemical	8.50 to 9.00
Prices per gross ton deliv'd consumers' yards:	
Textile cast.....	\$14.00 to \$14.50
No. 1 machinery cast....	14.50 to 15.25
No. 2 machinery cast....	14.00 to 14.50
Stove plate .....	11.00 to 11.50
Railroad malleable .....	16.50 to 17.00

## Birmingham

### Finished Steel Production at High Rates Brings Shortage of Ingots—Pig Iron Buying Dull

BIRMINGHAM, March 11.—District buying of pig iron has slowed up this month. Most of the consumers have enough iron to last until books are opened for the second quarter, and they prefer to await developments before making further commitments. Requests for quotations on second quarter iron have been fairly numerous, though offers to buy have not been particularly impressive.

Shipping orders continue to come in at about the same rate as in the past few weeks, the aggregate being enough to move current production. Shipments to pressure pipe shops are better than in several months. Soil pipe producers have not shown increased interest in the market. The feeling prevails that the present base price of \$15 will apply on second quarter contracts, books for which may be opened this week. Seventeen furnaces have been active during the past 30 days. Of this number, 11 are on foundry iron, five on basic and one on recarburizing iron.

*Prices per gross ton, f.o.b. Birmingham dist. furnaces:*  
No. 2 fdy., 1.75 to 2.25 sll. .... \$15.00  
No. 1 fdy., 2.25 to 2.75 sll. .... 15.50  
Basic ..... 15.00

**Finished Steel.**—A shortage of ingots is reported despite the fact that ingot production is at capacity rates. Finishing mills are operating at the highest rates of the past several months. Demand has receded since March 1. Whether this is one of the temporary lulls that come occasionally will be judged largely by early developments. The cotton tie market has opened up and buying for rail requirements is under way. No sheets are being stocked, a departure from the usual condition at this season in past years. Quotations on all products are unchanged.

The Seaboard Air Line Railway has placed an order with the Bessemer plant of the Pullman Car & Mfg. Co. for 1000 all-steel box cars. Structural steel fabricators have experienced a second successive light week in new business. Reinforcing bar demand is better than in several weeks.

Nineteen open-hearths are active, the same as last week.

**Cast Iron Pipe.**—Pressure pipe lettings last week were below the recent weekly average, though inquiries were strong. Municipal tonnages up for figures and those pending for the remainder of this month give the market a favorable outlook. Among the projects being bid on are 2900 tons of 6 and 8-in. pipe for Detroit; 14,000 ft. for Canton, Ohio; 1000 tons of 12 to 20-in. pipe for Shreveport, La., and a fair-sized project for Coolamie, N. C. Plants are also bidding on good tonnages for Portland, Ore., and Los

Angeles, Cal., which are to be awarded this week.

Owing to the higher freight rates scheduled to become effective March 20, demands for shipments have increased to the point where plants cannot handle them. Production is being pushed to supply sizes not in stock. Prices continue firm at \$37 to \$38 a ton, Birmingham.

**Coke.**—The movement of foundry and industrial coke is steady but seasonally light. Operations of by-product coke ovens during the past 30

days have been at a lower rate than any time last year. Prices are unchanged.

**Old Material.**—Shipments of scrap to the large steel mills have declined this month. Foundries are not buying, and cast grades remain inactive. The unchanged quotations represent nominal values.

*Prices per gross ton, deliv'd Birmingham dist. consumers' yards:*

Heavy melting steel	\$13.00 to \$13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

## St. Louis

### Pig Iron Melt Increasing Though Buying Is Slow—Steady Flow of Small Steel Orders

ST. LOUIS, March 11.—The pig iron market is quiet. Most melters are believed to have covered for their requirements for the first quarter and some partly into the second quarter of the year, and further buying activities are being ruled by caution. Sales for the week are believed to be around 3000 tons, most of which was closed by a leading Southern maker. With steadily increasing specifications for pig iron by Southern pipe manufacturers, the market has a firmer tone, although prices are unchanged. Shipments against contracts are being well maintained. The melt in the district is increasing.

*Prices per gross ton at St. Louis:*

No. 2 fdy., sll. 1.75 to 2.25, f.o.b. Granite City, Ill.	\$19.50 to \$20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	17.42 to 18.42
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

*Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.*

**Finished Steel.**—A steady flow of

#### Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
Per Cent Off List	
Tank rivets, $\frac{1}{4}$ -in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq. blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

orders, although not in large volume, is being received for plates, shapes and bars. The demand for sheets is slow. New business from the railroads is light, but it is expected they will shortly release requisitions that have been withheld for some time. An improvement in reinforcing bar business is reported, although the demand for structurals is light.

**Old Material.**—Melting steel grades are off 25c. a ton as a result of a lack of interest by consumers and an increasing movement to this market from country dealers. Railroad lists: Pennsylvania, 47,725 tons; Baltimore & Ohio, 9345 tons; Atchison, Topeka & Santa Fe, 5720 tons; Wabash, 2440 tons; Ann Arbor, 176 tons; Chicago, Rock Island & Pacific, 130 carloads; Great Northern, 61 carloads; St. Louis-San Francisco, 48 carloads; Chicago & Eastern Illinois, 17 carloads.

*Dealers' buying prices per gross ton, f.o.b. St. Louis district:*

Selected heavy melting steel	\$13.50 to \$13.75
No. 1 heavy melting or shoveling steel	12.75 to 13.00
No. 2 heavy melting or shoveling steel	11.75 to 12.00
No. 1 locomotive tires	14.50 to 15.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	13.75 to 14.00
Railroad springs	16.00 to 16.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	12.75 to 13.00
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	14.00 to 14.50
Machine shop turnings	6.75 to 7.25
Heavy turnings	9.00 to 9.50
Steel car axles	19.50 to 20.00
Iron car axles	26.00 to 26.50
Wrot. iron bars and trans.	21.00 to 21.50
No. 1 railroad wrought	12.50 to 13.00
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	14.00 to 14.50
Stove plate	11.75 to 12.25
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00
Agricult. malleable	13.00 to 13.50

## Buffalo

### Pig Iron Orders Usually Small, but Large Inquiries Are Pending—Scrap Market Quiet and Soft

BUFFALO, March 11.—Bookings of pig iron in this territory in the past week totaled about 8000 tons. Most of the orders were comparatively small. One seller reports two orders, each for 500 tons of foundry. Another reports aggregate orders of 3500 tons, including one lot of 1000 tons. Current inquiry includes one lot of 2000 tons of foundry from the East and two others for 1000 tons of foundry, both originating in New England.

Prices are being quoted for second quarter delivery, although not much of this type of business is being offered. Some of the local furnaces are holding to \$17 base, on Eastern shipment, but are frank in stating they are not getting the business at this price. Southern iron is a highly competitive factor in Eastern business, as is Port Henry iron.

Furnace operations are holding at the recent level. The Lackawanna plant of the Bethlehem Steel Co. has put one furnace out for repair and has put another in blast, leaving the same total of five out of seven in blast. The Hanna Furnace Co.'s Hamburg Street stack has been switched temporarily from silvery to foundry. Shipments are steady.

*Prices per gross ton, f.o.b. furnace:*  
No. 2 fdy., sil. 1.75 to 2.25.....\$18.50  
No. 2X fdy., sil. 2.25 to 2.75.....19.00  
No. 1 fdy., sil. 2.75 to 3.25.....20.00  
Malleable, sil. up to 2.25.....19.00  
Basic .....17.00  
Lake Superior charcoal.....27.28

**Finished Steel.**—The Lackawanna plant of the Bethlehem Steel Co. has reduced the number of open-hearths in operation by two, making the active total 19 of 24. This decrease was due to the fact that a structural mill went on single turn instead of double. Approximately half of the Bethlehem mills are on single turn and half on double turn. Other plants are operating just as they were. Structural business is very quiet, and only small orders are noted. Reinforcing bar commitments are below normal for the season.

**Old Material.**—The market seems to be a little bit softer owing to the fact that considerable scrap is backing up in this territory. There has

been very little new buying. Dealers are continuing to pay \$15 for heavy melting steel against a recent order at \$15.50. There have been one or two small sales of stove plate at \$13. A small sale of 2-ft. rails is reported at \$18. With the recent open weather, scrap is coming out more freely, but it is doubtful if a tonnage of selected No. 1 steel could be purchased at less than \$15. to \$15.50.

*Prices per gross ton f.o.b. Buffalo consumers' plants:*

**Basic Open-Hearth Grades:**  
No. 1 heavy melting steel. \$14.50 to \$15.50  
No. 2 heavy melting scrap. 12.50  
Scrap rails.....14.75 to 15.25  
Hydraul. comp. sheets.....12.50  
Hand bundled sheets.....10.50 to 11.00  
Drop forge flashings.....12.50

No. 1 busheling.....13.00 to 13.75  
Hvy. steel axle turnings.....13.50 to 14.00  
Machine shop turnings.....9.50 to 10.00  
No. 1 railroad wrought.....11.00 to 11.50

#### Acid Open-Hearth Grades:

Knuckles and couplers.....18.00 to 19.00  
Coil and leaf springs.....18.00 to 19.00  
Rolled steel wheels.....18.00 to 18.50  
Low phos billet and bloom ends.....18.00 to 19.00

#### Electric Furnace Grades:

Short shov. steel turnings. 12.50 to 13.00

#### Blast Furnace Grades:

Short mixed borings and turnings.....11.00 to 11.50  
Cast iron borings.....11.00 to 11.50  
No. 2 busheling.....8.00

#### Rolling Mill Grades:

Steel car axles.....17.00 to 17.50  
Iron axles.....20.00 to 21.00

#### Cupola Grades:

No. 1 machinery cast.....14.50 to 15.00  
Stove plate.....12.75 to 13.00  
Locomotive grate bars.....10.50 to 11.00  
Steel rails, 3 ft. and under.....17.50 to 18.00  
Cast iron carwheels.....12.00 to 12.50

#### Malleable Grades:

Industrial .....16.50 to 17.00  
Railroad .....16.50 to 17.00  
Agricultural .....16.50 to 17.00

#### Special Grades:

Chemical borings.....12.00 to 12.50

## Cincinnati

### Pig Iron Sales Jump to 7450 Tons, Although Melt Is Below That of January

CINCINNATI, March 11.—Demand for pig iron in this district spurted last week, as consumers hurried to the market to cover for the next 30 days. Total sales were about 7450 tons, of which only about 700 tons was Southern iron. The district melt is still light, the anticipated increase in March not having materialized. In fact, the melt is lighter than in January, and there is no indication of improvement. Accordingly, consumers are careful in their purchases, taking iron only as the need arises. Price schedules on Southern iron appear to have settled at about \$13, base Birmingham, in this district, but even at this attractive figure demand for Southern iron is not brisk. Among the week's orders was one for 200 tons of 6 per cent silvery from a central Indiana consumer. A central Ohio buyer took 3500 tons of Northern foundry iron and a central Indiana melter bought 1000 tons.

*Prices per gross ton, deliv'd Cincinnati:*

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89 to \$20.39
Ala. fdy., sil. 1.75 to 2.25	16.69 to 17.69
Ala. fdy., sil. 2.25 to 2.75	17.19 to 18.19
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 17.69
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

**Finished Material.**—The demand for sheets showed no improvement during the past week. Bookings and production were about 60 per cent of normal.

**Warehouse Business.**—One of the leading jobbers has announced quantity differentials which apply on most of the hot-rolled products. The schedule follows: 399 lb. and under, 50c. per 100 lb. over base; 400 to 3999 lb., base; 4000 to 7999 lb., 15c. per 100

lb. below base; 8000 to 14,999 lb., 25c. per 100 lb. below base; 15,000 lb. and over, 35c. per 100 lb. below base.

**Old Material.**—While scrap is moving on contract, the tendency of district mills is to restrict shipments to meet current needs. New business is slow. Dealers have reduced prices on heavy melting steel and No. 2 wrought 25c. a ton.

*Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:*

Heavy melting steel.....\$12.00 to \$12.50
Scrap rails for melting.....13.25 to 13.75
Loose sheet clippings.....8.00 to 8.50
Bundled sheets.....10.75 to 11.25
Cast iron borings.....9.00 to 9.50
Machine shop turnings.....8.25 to 8.75
No. 1 busheling.....10.00 to 10.50
No. 2 busheling.....6.50 to 7.00
Rails for rolling.....13.50 to 14.00
No. 1 locomotive tires.....14.25 to 14.75
No. 2 railroad wrought.....12.25 to 12.75
Short rails.....17.75 to 18.25
Cast iron carwheels.....12.00 to 12.50
No. 1 machinery cast.....18.50 to 19.00
No. 1 railroad cast.....15.00 to 15.50
Burnt cast.....10.00 to 10.50
Stove plate.....10.00 to 10.50
Brake shoes.....10.00 to 10.50
Agricultural malleable.....14.00 to 14.50
Railroad malleable.....15.00 to 15.50

#### Warehouse Prices, f.o.b. Cincinnati

##### Base per Lb.

Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinforce. bars.....	3.15c.
Rail steel reinforce. bars.....	3.00c.
Hoops.....	4.05c.
Bands.....	3.50c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets.....	4.20c.
Small rivets.....	60 per cent off list
No. 9 ann'l'd wire, per 100 lb. ....	\$3.00
Com. wire nails, base per keg.....	2.85
Cement c't'd nails, base 100 lb. keg.....	2.85
Chain, per 100 lb. ....	10.25

##### Net per 100 Ft.

Lap-welded steel boiler tubes, 2-in. ....	\$16.50
4-in. ....	34.50
Seamless steel boiler tubes, 2-in. ....	17.50
4-in. ....	36.00

#### Warehouse Prices, f.o.b. Buffalo

##### Base per Lb.

Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.95c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'l'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.20
Black wire, base per 100 lb. ....	3.45

## Canada

### Dominion Industry Is on the Uptrend

TORONTO, ONT., March 11.—With the steel mill, locomotive works and car building plants well supplied with orders from the Canadian National and Canadian Pacific Railroads, the iron and steel industry is assured of near-capacity operations for several months. Foundries making castings and carwheels have recently stepped up production and are running on a steadily expanding scale.

**Pig Iron.**—Inquiry for second delivery iron has become more plentiful. While only a few melters have covered so far, several of the larger users will make known their requirements within a few days. Spot buying is also a strong feature of the market. Producers are accepting second quarter contracts at current prices.

#### Prices per gross ton:

Delivered Toronto	Per Gross Ton
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.60
No. 2 fdy., sil. 1.75 to 2.25.....	22.10
Malleable .....	22.60
Delivered Montreal	Per Gross Ton
No. 1 fdy., sil. 2.25 to 2.75.....	\$24.00
No. 2 fdy., sil. 1.75 to 2.25.....	23.50
Malleable .....	24.00
Basic .....	22.50
Imported Iron, Montreal Warehouse	Per Gross Ton
Summerlee .....	\$33.50
Carron .....	33.00

**Structural Steel.**—Several substantial contracts are pending for early closing. The Canadian Pacific Railway will be a factor in stimulating the demand for structural steel in the early future. In addition to its heavy purchases in connection with hotel and station construction, it is reported that it will build in British Columbia this year five steel bridges, requiring 10,000 to 20,000 tons of steel.

**Old Material.**—The betterment in the iron and steel industry is reflected in a growing demand for iron and steel scrap in the Toronto, Hamilton and Montreal districts. Mills are placing orders for immediate needs and some future buying is also being done. No change has been made in buying prices.

#### Dealers' buying prices:

	Per Gross Ton	Per Net Ton
Heavy melting steel.....	\$9.00	\$8.00
Rails, scrap.....	11.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings.....	7.00	6.00
Boiler plate.....	7.00	6.50
Heavy axle turnings.....	7.50	6.50
Cast borings.....	6.50	5.00
Steel borings.....	6.50	6.00
Wrought pipe.....	6.00	6.00
Steel axles.....	14.00	17.00
Axles, wrought iron.....	16.00	19.00
No. 1 machinery cast.....	16.00	16.00
Stove plate.....	12.00	12.00
Standard carwheels.....	14.50	13.00
Malleable .....	13.00	13.00

Switch & Signal Co. in 1881. He later went with the Westinghouse company and served as purchasing agent for many years prior to his partial retirement. Since that time he had acted in a consulting capacity.

**NATHAN PATTERSON HYNDMAN,** sales agent at Pittsburgh for the Washington Coal & Coke Co., Dawson, Pa., and prominently identified with coal and coke business in the



N. P. HYNDMAN

## OBITUARY

**WILLIAM H. BALDRIDGE,** formerly vice-president, and one of the organizers, of the Weirton Steel Co., Weirton, W. Va., died on March 5 at his home in Jersey City. He was born at Covington, Ky., in 1867 and began his business career with the Humbert Tin Plate Co., Connellsville, Pa., later merged with the American Sheet Steel Co., which subsequently became a part of the American Sheet & Tin Plate Co. In 1905 Mr. Baldridge, with E. T. Weir, J. C. Williams and others, was identified with the formation of the Phillips Tin Plate Co., Morgantown, W. Va., which formed the nucleus of the present Weirton Steel Co. Mr. Baldridge served as vice-president of the company for many years, with headquarters in New York, but had retired from active duty some 10 years ago on account of failing health.

versity, Washington, and established himself in Milwaukee in 1881, retiring from active business several years ago.

**DANIEL JOSEPH CULLINAN,** for many years prominently identified with the foundry industry, particularly at Pittsburgh, died at his home in Pittsburgh on March 4, aged 77 years. He was born in Ireland and came to this country when 15 years of age, locating in Cleveland. There he established the Forest Hills Malleable Iron Works, which later was consolidated with the McConway & Torley Co., Pittsburgh. In 1893 Mr. Cullinan helped to organize the Western Foundry Co., Chicago, of which he was a director at the time of his death. He had been identified with many other Pittsburgh industries, but recently had been living in semi-retirement.

**WILLIAM J. LONGMORE,** consulting purchasing agent for the Westinghouse Electric & Mfg. Co., East Pittsburgh, died at his home in Bellevue, Pa., on March 4, aged 70 years. He was born at Allegheny, Pa., now North Side, Pittsburgh, and began his business career with the Union

Pittsburgh and Connellsville districts for more than 50 years, died on March 10 after a long illness. He was born at Mauch Chunk, Pa., in 1849, and began his business career with the Lehigh Coal & Navigation Co. in 1868. In 1882 he went to Pittsburgh to become sales agent for the Connellsville Coke & Iron Co., remaining in that position until 1889 when the company was sold to the H. C. Frick Coke Co. After a year with the Frick company he entered the mine supply business in the Pittsburgh district, later becoming manager in that territory for the Hazard Mfg. Co., Wilkes Barre, Pa. He had held this position until a change in the ownership of the company two years ago. When the Washington Coal & Coke Co. was organized in 1894, Mr. Hyndman became its sales agent, and had held that position until his death. Two sons, Hugh R. and T. Malcolm, have been in charge of the business during their father's illness.

**CHARLES W. EVANS,** founder and president of the C. W. Evans Steel & Iron Co., Cincinnati, more than 50 years ago, died last week in Cincinnati, aged 89 years. He had been retired from active business for 20 years. He was a native of Staffordshire, England, and was brought to this country when a child.

**WINTER D. HESS,** western representative of the Builders Iron Foundry Co., and the Glamorgan Pipe & Foundry Co., with offices at 132 South Michigan Avenue, Chicago, died Feb. 27, following a heart attack.

**WILLIAM HINRICHES,** formerly president of the Wisconsin Bridge & Iron Co., Milwaukee, and afterward one of the organizers of the Wisconsin Motor Mfg. Co., Milwaukee, died March 3 in New York while visiting a nephew. He was born in Germany in 1863 and came to America in 1874. He attended George Washington Uni-

# Non-Ferrous Metal Markets

## Copper Quiet—Tin Active at New Lows — Lead Much Lower—Zinc Declines

NEW YORK, March 11.

**Copper.**—Sales are by no means satisfactory to producers. Fabricators have stayed out of the market longer than was expected. Reports are, however, that business is slowly picking up, but actual data are conflicting. Some producers state that domestic business thus far in March is better than in January or February and others state that March orders are even less than in February. Sales to foreign consumers are better. Thus far this month the total has been about 10,000 tons, which is at a larger rate than in January or February. Sales of 1875 tons are noted for yesterday and about 1400 last Friday, with something like 700 on Saturday.

Wire makers are the busiest of the fabricators, but reports as to the condition of others are not encouraging. Statistics for February will be out tomorrow, March 12, and are expected to show an increase in refined stocks of 20,000 to 25,000 tons, comparing with 32,000 tons in January.

The price situation is still intact, and electrolytic copper is quoted firm at 18c., delivered in the Connecticut Valley, with the price of Copper Exporters, Inc., still at 18.30c., c.i.f., usual European ports. Lake copper is moderately active at 18c. to 18.12½c., delivered.

**Tin.**—Spot Straits tin on March 6 sold at a new low price, at 35.87½c., the lowest since Nov. 29, 1922. Recognizing its cheapness, consumers have come into the market the past week and total sales for the week ended today have been about 2000 tons. The deliveries involved were spread over a considerable time, sales including October.

Stocks in London warehouses are now 15,002 tons, an increase of 131 tons in the last week. There is considerable talk in London circles about curtailment and the question still is vital as to whether such restrictions will offset poor business the world over.

Today the market is quiet, with spot Straits tin quoted at 36.62½c., New York. Consumers here are comfortably covered for some time to come.

**Lead.**—Following two reductions a week ago, the American Smelting & Refining Co. lowered its price four times in the last week. The latest one was yesterday to 5.50c., New

### THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Mar. 11	Mar. 10	Mar. 8	Mar. 7	Mar. 6	Mar. 5
Lake copper, New York.....	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*.....	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y. ....	36.62½	36.12½	....	36.25	35.87½	36.50
Zinc, East St. Louis.....	5.00	5.00	5.00	5.00	5.10	5.10
Zinc, New York.....	5.35	5.35	5.35	5.35	5.45	5.45
Lead, St. Louis.....	5.35	5.35	5.45	5.60	5.70	5.85
Lead, New York.....	5.50	5.50	5.60	5.75	5.85	6.00

\*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

### Rolled Products

#### List Prices, Per Lb., f.o.b. Mill

*On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over*

##### *Sheets—*

High brass .....	23.25c.
Copper, hot rolled.....	26.75c.
Zinc .....	10.50c.
Lead (full sheets) .....	9.75c.

##### *Seamless Tubes—*

High brass .....	28.25c.
Copper .....	29.25c.

##### *Rods—*

High brass .....	21.25c.
Naval brass .....	24.00c.

##### *Wire—*

Copper .....	19.87½c.
High brass .....	23.75c.
Copper in Rolls.....	26.75c.

Brazed Brass Tubing.....	30.87½c.
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#### Aluminum Products in Ton Lots

*The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.*

Sheets, 0 to 10 gage, 3 to 30 in. wide .....	33.00c.
Tubes, base .....	42.00c.
Machine rods .....	34.00c.

### Chicago Warehouse

*(Prices Cover Trucking to Customers' Doors in City Limits)*

##### *Sheets—*

	Base per Lb.
High brass .....	23.25c.
Copper, hot rolled.....	27.75c.
Copper, cold rolled, 14 oz. and heavier .....	30.00c.
Zinc .....	10.75c.
Lead, wide.....	10.30c.

##### *Seamless Tubes—*

Brass .....	28.25c.
Copper .....	29.25c.

Brass Rods .....	21.25c.
Brazed Brass Tubes.....	31.00c.

### New York or Cleveland Warehouse

#### Delivered Prices, Base per Lb.

High brass.....	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes.....	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	30.00c. to 31.00c.
Seamless Tubes—	
Brass .....	26.00c. to 27.00c.
Copper .....	29.12½c. to 30.12½c.
Brass Rods .....	18.87½c. to 19.87½c.
Brazed Brass Tubes.....	29.12½c. to 30.12½c.

*Delivered Prices, Base per Lb.*

High brass.....	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes.....	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	30.00c. to 31.00c.
Seamless Tubes—	
Brass .....	26.00c. to 27.00c.
Copper .....	29.12½c. to 30.12½c.
Brass Rods .....	18.87½c. to 19.87½c.
Brazed Brass Tubes.....	29.12½c. to 30.12½c.

### New York Warehouse

#### Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks .....	10.75c. to 11.25c.
Zinc sheets, open .....	11.50c. to 12.00c.

### Metals from New York Warehouse

#### Delivered Prices, Per Lb.

Tin, Straits pig .....	38.75c. to 39.75c.
Tin, bar .....	40.75c. to 41.75c.
Copper, Lake .....	19.50c.
Copper, electrolytic .....	19.25c.
Copper, casting .....	19.00c.
Zinc, slab .....	6.50c. to 7.50c.
Lead, American pig .....	6.50c. to 7.00c.
Lead, bar .....	8.50c. to 9.00c.
Antimony, Asiatic .....	11.00c. to 11.50c.
Aluminum, No. 1 ingots for remelting (guaranteed over 99% pure) .....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy .....	24.00c. to 25.00c.
Babbitt metal, commercial grade .....	25.00c. to 35.00c.
Solder, ½ and ⅓ .....	26.00c. to 27.00c.

### Metals from Cleveland Warehouse

#### Delivered Prices, Per Lb.

Tin, Straits pig .....	41.50c.
Tin, bar .....	43.50c.
Copper, Lake .....	19.50c.
Copper, electrolytic .....	19.25c.
Copper, casting .....	18.75c.
Zinc, slab .....	7.50c. to 7.75c.
Lead, American pig .....	6.50c. to 6.75c.
Lead, bar .....	8.75c.
Antimony, Asiatic .....	16.00c.
Babbitt metal, medium grade .....	17.50c.
Babbitt metal, high grade .....	14.50c.
Solder, ½ and ⅓ .....	27.50c.

### Old Metals, Per Lb., New York

*Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.*

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible .....	15.00c.	16.50c.
Copper, hvy. and wire .....	14.50c.	16.25c.
Copper, light and bot-toms .....	12.50c.	14.00c.
Brass, heavy .....	8.00c.	9.25c.
Brass, light .....	6.75c.	7.75c.
Hvy. machine compo-sition .....	11.25c.	12.25c.
No. 1 yel. brass turnings .....	9.00c.	9.50c.
No. 1 red brass or compos. turnings .....	10.50c.	11.75c.
Lead, heavy .....	4.25c.	4.75c.
Lead, tea .....	3.50c.	4.00c.
Zinc .....	2.75c.	3.25c.
Sheet aluminum .....	10.50c.	12.50c.
Cast aluminum .....	10.00c.	12.00c.

York, a reduction of  $\frac{1}{2}$ c. in the week. Overproduction, particularly abroad, and falling prices at London are the causes.

In the outside market the leading interest at St. Louis is out of the market, being unwilling to sell at lower than 5.50c., St. Louis. Metal is available from other producers in the West at the nominal price of 5.35c., St. Louis. In the face of such drastic reductions in the past two weeks, demand is practically nil.

**Zinc.**—Prime Western zinc has eased off further and is now quoted by most producers at the largely nominal price of 5c., East St. Louis, or 5.35c., New York. Demand is so light that a fair test of the market is not possible. It is stated that the East St. Louis price would be shaded on desirable business, by at least one or two producers, to 4.95c., East St. Louis.

Expected advances in the ore price have not materialized and the quotation is unchanged at \$37, Joplin. This is due to smaller purchases and larger outputs. Sales last week were about 6900 tons, with production about 10,000 tons, leaving the surplus still very small at about 10,000 tons.

**Antimony.**—Partly in sympathy with lower prices in most other metals and because of offerings of

metal which has arrived, Chinese antimony is quoted lower this week at 8.75c., New York, duty paid, for spot and March delivery. Futures, disregarding duty, are quoted at 5.62 $\frac{1}{2}$ c., c.i.f. There is very little buying.

**Nickel.**—Ingot nickel in wholesale lots is quoted at 35c. a lb. with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

**Aluminum.**—The published quotation of virgin metal, 98 to 99 per cent pure, is unchanged at 23.90c. a lb., delivered.

#### Non-Ferrous Metals at Chicago

CHICAGO, March 11.—Prices for all commodities with the exception of copper are lower. Lead is especially weak following several readjustments downward in the last few days. Quotations are lower for old metals in the lead and tin grades.

**Prices per lb., in carload lots:** Lake copper, 18.50c.; tin, 36.87 $\frac{1}{2}$ c.; lead, 5.45c.; zinc, 5.10c.; in less-than-carload lots, antimony, 9.62 $\frac{1}{2}$ c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4c.; zinc, 3c.; pewter, No. 1, 18c.; tin-foil, 20c.; block tin, 25c.; aluminum, 12.87 $\frac{1}{2}$ c.; all being dealers' prices for less-than-carload lots.

### Reinforcing Steel

#### With Lettings at 5300 Tons, Market Is More Active

**AWARDS** of reinforcing steel the past week amounted to 5300 tons. New work up for bids totals 4100 tons and includes 3500 tons for a bridge at Los Angeles. Awards follow:

BANGOR, ME., 275 tons, telephone building, to Barker Steel Co.  
BROOKLYN, 600 tons, foundation for New York Telephone Co. building on Bridge Street, to Igoe Brothers.  
PHILADELPHIA, 700 tons, high school at Thirty-third and Tasker Streets, to Kalmann Steel Co.  
PHILADELPHIA, 230 tons, school at Fifth and Fitzwater Streets, to American Steel Engineering Co.  
VALLEY JUNCTION, IOWA, 200 tons, grain elevator, to an unnamed bidder.  
SUPERIOR, WIS., tonnage not stated, grain elevator, to an unnamed bidder.  
CHICAGO, 900 tons, warehouse for Commonwealth Edison Co., to an unnamed bidder.  
ERIE, PA., 1100 tons, filtration plant, to Bourne-Fuller Co.  
CHICAGO, 450 tons, apartment building on Barry Avenue, to Calumet Steel Co.  
CHICAGO, 400 tons, warehouse for Commonwealth Edison Co., to an unnamed bidder.  
ALTON, ILL., 200 tons, elevator for Standard-Tilton Milling Co., to Laclede Steel Co.  
SPRINGFIELD, Mo., 150 tons, public school, to Laclede Steel Co.  
PORTLAND, ORE., 123 tons, Keno bridge, to an unnamed bidder.

### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

LYNN, MASS., 400 tons, high school, previously reported as 200 tons.  
MEMPHIS, TENN., 150 tons, Post Office.  
LOS ANGELES, 3500 tons, Fourth Street bridge; bids April 2.  
OLYMPIA, WASH., 115 tons, three bridges in Kittitas County; bids March 25.  
SAN FRANCISCO, 350 tons, hospital at Presidio; general contract to Clinton Construction Co.  
SACRAMENTO, 139 tons, highway work in Glenn County; bids March 26.

### Railroad Equipment

#### Seaboard Air Line Orders 2000 Cars

**O**RTERS from the Seaboard Air Line for 2000 all-steel box cars, an inquiry from the Northern Pacific for 250 stock cars and an order for 25 locomotives for the Union Pacific feature the week's equipment business. Details follow:

Seaboard Air Line has ordered 2000 50-ton all-steel box cars, 1000 from Pullman Car & Mfg. Corporation and 1000 from Standard Steel Car Co.

Norfolk & Western closed bids on Monday on 1000 steel hopper car bodies.

American Refrigerator Transit Co. has bought 27 refrigerator cars from Mount Vernon Car Mfg. Co., in addition to 1000 reported last week as having been placed with the same company.

Louisville & Nashville has ordered 10 baggage cars from Pressed Steel Car Co. and four passenger-baggage, four coach-smokers, two baggage-mail and three dining cars from American Car & Foundry Co.

Pennsylvania Railroad has ordered 25 multiple unit passenger cars from Pressed Steel Car Co. and 20 of same type from American Car & Foundry Co.

Northern Pacific is inquiring for 250 steel underframe stock cars.

Chicago, Rock Island & Pacific is in the market for five baggage cars.

Union Pacific has ordered 25 4-12-2 type locomotives and 20 extra locomotives tenders from American Locomotive Co.

Texas & Pacific has ordered 25 caboose car underframes from Pullman Car & Mfg. Corporation.

Canadian National has ordered 12 lounge cars, 12 sleeping cars and five dining cars from Canadian Car & Foundry Co.

### New Presidents of Niles and Pratt & Whitney

C. K. SEYMOUR, who has been treasurer of the Niles-Bement-Pond Co., New York, which owns the Pratt & Whitney Co. and has a large interest in the Niles Tool Works Co. and the Pratt & Whitney Aircraft Corporation, was elected president of the holding company last week, succeeding COL. L. S. HORNER, who recently resigned.

CHARLES R. BURT was elected presi-



C. R. BURT

dent of the Pratt & Whitney Co., Hartford, Conn. Mr. Burt, who was formerly vice-president and general manager, succeeds as president J. K. CULLEN, who has retired.

WILLIAM P. KIRK, who was general manager of sales of the Pratt & Whitney Co., was elected vice-president in charge of sales. E. L. MORGAN was elected secretary and assistant treasurer, and B. E. JOHANN became assistant secretary. No change was made in the office of treasurer, which is filled by C. K. SEYMOUR, also president and treasurer of the Niles-Bement-Pond Co.

Five new directors have been added to the Pratt & Whitney board. They are: F. B. Rentschler, president of the Pratt & Whitney Aircraft Corporation; Charles W. Deeds; Charles M. Pond, head of the small tool and gage department of the company; David Ayr, head of the company's machinery department, and Mr. Kirk. Two directors, in addition to Mr. Cullen, resigned, these being L. S. Horner and G. S. Rentschler.

## PERSONAL

**SAMUEL N. SUMMER**, who was elected president of the Institute of Scrap Iron and Steel at the second annual convention last week in Chicago, is president and treasurer of the Joseph Schonthal Co., Columbus, Ohio. He is a graduate of Ohio State University. Besides his interest in the scrap business, he is president of the Springfield Suburban Railroad Co., Springfield, Ohio; vice-president of the West Virginia Rail Co., Huntington, W. Va.; director of the Huntington National Bank, Columbus, and

vice-president. The secretary-treasurer is LOUIS E. VOGEL.

**G. L. DRAFFAN** has been elected secretary and W. A. SPRINGER treasurer of the Ohio Brass Co., Mansfield, Ohio. J. M. STRICKLER has been appointed general manager of sales. Mr. Draffan has been with the company since 1916, being formerly assistant advertising manager, then assistant secretary and later general sales manager. Mr. Springer has been assistant treasurer and Mr. Strickler assistant sales manager.

**L. H. EMRICK**, of Detroit, has been appointed district sales representative for the Despatch Oven Co., Minneapolis, Minn.

**ROY CARNOVSKY** has been made superintendent of production of the Limousine Body Co.'s plant at Kalamazoo, Mich., a subsidiary of the Auburn Automobile Co. He was for 14 years head of production at the Fisher Body Co.'s plant No. 18 at Detroit.

**EDWARD N. GOSSELIN**, for the past two years vice-president and general manager for the Phoenix Mfg. Co., with plants at Joliet, Ill., Montreal, Canada, and Catasauqua, Pa., has recently been elected president and general manager. **JOHN W. KISER**, formerly president, has been made chairman of the board.

**L. H. BYRNE** has been appointed acting Western sales manager, with headquarters at Chicago, for the Jefferson Electric Co., Chicago.

**VERSIL E. ANNIS**, associated with the Greenfield Tap & Die Corporation for some 19 years and recently production manager, has entered the engineering department of the company and will be associated with its Detroit office.

**C. B. VINCENT**, secretary and treasurer of the Torrington Co. and associated with that company for 35 years, has relinquished his duties as such, but remains as chairman of the board. **A. W. BURG**, assistant treasurer, has been made treasurer, and **L. J. Ross**, secretary.

**WILLARD S. HARING**, formerly general sales manager of the Alan Wood Steel Co., Conshohocken, Pa., who was appointed vice-president in charge of Western sales, has opened a Los Angeles office in the W. M. Garland Building and has appointed **C. J. LA RUE**, formerly assistant purchasing agent of the Consolidated Steel Corporation, Los Angeles, as sales representative. **D. P. DOWNING**, formerly with the Bethlehem Steel Co. in Los Angeles and San Francisco, has been appointed district sales manager at San Francisco, with offices in the

Rialto Building. **PERRY FRANCIS**, formerly with A. B. Ambler, has been appointed district sales manager at Seattle, with offices in the Dexter-Horton Building.

**R. D. EVANS** and **C. F. WAGNER**, engineers for the Westinghouse Electric & Mfg. Co., East Pittsburgh, were among those sharing in the award of the George Montefiore Prize for 1929, which is given triennially for the best original work contributing to scientific advancement in the technical applications of electricity. It is presented by the Foundation George Montefiore of Liège, Belgium, and went to Messrs. Evans and Wagner for their papers on "Studies of Transmission Stability."



S. N. SUMMER



J. Davis Allen, as mentioned in *The Iron Age* of March 6, is now manager of the cold finished department of Jones & Laughlin Steel Corporation

also a director of the Huntington Securities Corporation of Columbus.

**DR. MORTIMER E. COOLEY**, of the University of Michigan and a former president of the American Society of Mechanical Engineers, was given the Washington Award for 1930, for outstanding merit as an engineer, at a dinner meeting of the Western Society of Engineers at Chicago, Feb. 24. The award was founded by John W. Alvord, past-president of the society, who wished to recognize merit in an engineer, irrespective of previous honors.

**E. R. NORRIS**, formerly general works manager of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has been appointed assistant to Vice-President **J. S. Tritle**, who is in general charge of manufacturing of the Westinghouse company. Mr. Norris will now be responsible for all plant facilities of the company, manufacturing methods, cost reductions and inspection. He has been associated with the Westinghouse company since 1892.

**JESSE W. OTTO**, formerly vice-president of the Wisconsin Machinery & Mfg. Co., Milwaukee, has been elected president to fill the vacancy caused by the death of William H. Vogel. **O. W. BROWN** has been elected

**F. E. HARRELL**, who has been with the Reliance Electric & Engineering Co., Cleveland, since 1924, has been appointed engineer in charge of drafting and experimental departments.

**G. GIFFAULT**, heretofore manager of the New York sales district of the Baltimore Copper Mills, division of the Revere Copper & Brass, Inc., has been made manager of the newly-established Philadelphia office of the company. **DAVID HICKMAN**, formerly Cincinnati representative of the Rome Brass & Copper Co., has been appointed assistant manager.

**M. C. STEFFEN**, of the St. Louis office of Cutler-Hammer, Inc., Milwaukee, has been made manager of the Cincinnati office, succeeding **R. I. MAUJER**, who has resigned.

**RALPH E. FLANDERS**, manager, Jones & Lamson Machine Co., Springfield, Vt., on March 18 will address a joint meeting of the Providence, R. I., section of the American Society of Mechanical Engineers and the Providence Engineering Society.

**EARL F. REINHART**, for the past 15 years with the Pullman Car & Mfg. Co., has been appointed assistant to the president of the combined Latrobe Tool Co. and J. M. Carpenter Tap & Die Co.

**P. LOYD LEWIS** has been transferred from the management of the Kansas City branch office of the Wagner Electric Corporation to the home office, where he will be in charge of the merchandising division.

**W. GEORGE COOK**, for the past three years assistant sales manager of the New Jersey Asbestos Co., has been appointed special railroad representative, with headquarters in Chicago, for the Lunkenheimer Co., Cincinnati.

**C. G. WILLIAMS** has been appointed chief engineer of the Green Bay Barker Machine & Tool Works, Green Bay, Wis.

**C. O. WEISSENBURGER**, for the past 13 years vice-president and general manager of the Marietta Mfg. Co., Point Pleasant, W. Va., has been elected president to succeed the late Walter A. Windsor.

**GEORGE B. PEGRAM**, dean of the faculty of engineering, Columbia University, New York, retires July 1 as dean after 13 years of service. He will be succeeded by **JOSEPH W. BARKER**, head of the Department of Electrical Engineering at Lehigh University.

**A. F. PREUSTER**, who has been with the Republic Carbon Co., Niagara Falls, N. Y., for the past 10 years, has become identified with the International Graphite & Electrode Corporation, Niagara Falls. He was associated for over 15 years with the late Francis A. J. Fitzgerald, of the Fitzgerald Laboratories, Inc.

**W. H. WASHBURNE**, who has had 18 years' experience in the automotive parts industry, has been appointed district manager of the industrial sales division in Middle Western territory for the Aluminum Industries, Inc., Cincinnati.

**B. D. SAKLATWALLA**, vice-president of the Vanadium Corporation of America, addressed the March 6 meeting of the Pittsburgh chapter of the American Society for Steel Treating on the place of vanadium in chemistry and metallurgy.

**C. H. JENSEN**, heretofore associated with the Pittsburgh branch of the Bylesby Engineering & Management Corporation, has joined the engineering staff of the Copperweld Steel Co., Glassport, Pa.

**ALBERT WALTON**, consulting engineer, United Engineering & Foundry Co., Pittsburgh, will speak on "Foundry Practice, Its Relation to Profits," at the regular monthly meeting of the Pittsburgh Foundrymen's Association to be held at the Fort Pitt Hotel on March 17.

## Cleveland Committees for Foundry Convention

Committees to arrange for the entertainment of visitors attending the annual convention and exhibition of the American Foundrymen's Association in Cleveland, May 12 to 15, have been organized by the Cleveland foundrymen and manufacturers of equipment and supplies. These committees are now at work and a program will be announced shortly.

**WALTER L. SEELBACH**, of the Forest City-Walworth Run Foundries Co., Cleveland, is general chairman of the executive committee with Ralph H. West, West Steel Casting Co., vice-chairman.

Chairmen of some of the important committees are as follows: Finance committee, Leroy P. Robinson, Werner G. Smith Co.; plant visitation committee, J. S. Smith, Smith Facing & Supply Co.; publicity committee, Dan M. Avey, Penton Publishing Co.; entertainment committee, S. C. Vessy, W. W. Sly Mfg. Co.; secretary of executive committee, Frank G. Steinbach, *Foundry*. The chairman of the welcoming sub-committee of the entertainment committee is B. R. Pearse, Atlas Foundry Co., and the chairman of the golf sub-committee of the entertainment committee is B. F. Fuller, Whitehead Brothers Co. Mrs. R. H. West is chairman of the ladies reception sub-committee of the entertainment committee.

## Officers of Tin Trade Association

The American Tin Trade Association will hold its annual meeting in New York on March 13, for the election of officers for the ensuing year. The nominating committee has presented the following as its nominations to be voted upon:

President, A. B. Hall, National Lead Co.; vice-president, C. S. J. Trench, Charles S. Trench & Co.; treasurer, M. H. Wehncke, Brandeis, Goldschmidt & Co.; directors: Edwin Groves, James W. Phyne & Co.; John Hughes, United States Steel Corporation; James E. Pope, Pope Trading Corporation; Erwin Vogelsang, Lewis Lazarus & Sons of New York, Inc.

## Associated Alloy Steel Co. Opens Branch Offices

Branch offices are being opened in a number of cities by the Associated Alloy Steel Co., Inc., recently organized by the Timken Roller Bearing Co., Sharon Steel Hoop Co. and Ludlum Steel Co. to sell nitroosity, nitrally and stainless steels manufactured by those companies. General offices have been opened at 1806 Union Trust Building, Cleveland, in charge of David B. Carson, vice-president and treasurer.

The following district sales offices have been established: New York, 230 Park Avenue, P. L. Coddington, district sales manager; Detroit, 920

Fisher Building, J. E. Polhemus, assistant vice-president; Philadelphia, 1834 Lewis Building, G. F. Wilson, district sales manager; Chicago, 333 North Michigan Avenue, P. E. Floyd, district sales manager; Cleveland, 1806 Union Trust Building, T. C. Sherman, district manager; New Haven, Conn., 406 Century Building, R. P. J. McCarty, district sales manager; San Francisco, 90 Tehama Street, George E. Batten, district sales manager; and Los Angeles, 1417 Santa Fe Avenue, James H. Spade, district sales manager.

## H. K. Ferguson Co. Absorbs De Vore Co., Toledo

The H. K. Ferguson Co., Cleveland engineer and builder, has taken over the De Vore Co., Toledo, Ohio, specialist in glass plant and paper mill layout and design. H. C. Van Tine, president of the De Vore Co., will join the Ferguson organization about April 1 as contract engineer and consultant in the design of glass and paper factories.

For 15 years the De Vore Co. has designed plants in the United States and Canada for the Libbey-Owens Co. and the Mid-West Box Co. and its successor, the Container Corporation of America. Plants designed by the De Vore Co. include that of the Ford Plate Glass Co., Toledo; the Buckeye Traction Ditcher Co., Findlay, Ohio, and the Ohio Brass Co., Mansfield.

## Wage Incentive in Manufacturing

(Concluded from page 786)

Trundle, are going to disappear. Nevertheless they will be existent in high wages for a standard accomplishment, when we get far enough along with management to know just how to set both the wages and the accomplishment.

In response to questions, Mr. Kift said that his plant has definite penalties set up which accrue against the extra pay of the wage incentive, but not against the day rate acting as a basis. In some cases these penalties might reduce the bonus or premium from perhaps 35 per cent or 30 per cent or less.

In some cases a severe penalty has been known to knock out the entire premium earnings of a month. Inasmuch as the worker usually has set up his scale of living to correspond with a definite rate of bonus which he has been earning for some time, the management finds it convenient to spread the application of such a heavy penalty over several months, sometimes as high as five, instead of taking it all out of one month's earnings.

Insofar as this system takes account of the hours set up to perform a given task, the premium is based on a definite percentage increase in pay for the same percentage decrease in the hours taken for the set task.

# Machinery Markets and News of the Works

## Improvement Is Spotty

Some Gains in Machine Tool Buying, But on the Whole the Situation Is Unchanged

THOUGH a few sellers of machine tools report slightly better orders in the past week, the improvement is spotty, and it cannot be said that the situation in the industry has changed materially this month as compared with February.

A great deal of business is pending on which quotations have gone out since the first of the year. However, prospective purchasers are still slow in placing orders. It is reported from Chicago that some recent orders were for machines on which quotations were made in the last two months of 1929.

Inquiries of the Amtorg Trading Co., New York, the buying agent for Soviet Russia, are the outstanding feature of the market so far as bulk buying is concerned. This company now is getting bids on about 30 tools, and it is stated that its program calls for

the purchase of a much larger number within the near future.

Railroad buying may take a slight spurt within the next week. The Delaware, Lackawanna & Western is said to be ready to place orders for 15 tools for which it recently inquired, and it is thought likely that the Milwaukee Road will soon buy at Chicago against a recent list. The Santa Fe also has a good many tools still to buy.

A few orders have come from automobile companies, notably for crank-shaft lathes. The farm implement and machinery industry, though busy, is not a large buyer of tools at the moment.

On the whole, however, the market is drifting rather aimlessly, and the time at which a definite upturn may be expected is still in doubt.

and distributing plant. Main factory is at 257 East Erie Street, Chicago.

Gerald J. O'Reilly, 11 East Forty-fourth Street, New York, architect, has plans for a multi-story automobile service, repair and garage building at 318 East Forty-eighth Street, to cost about \$140,000 with equipment.

Officials of Manhattan Electrical Supply Co., 15 Park Place, New York, are arranging for organization of new company, to be known as American Machine & Metals, Inc., with capital of 500,000 shares of stock, no par value, to take over and operate Manhattan company and subsidiaries, latter including Troy Laundry Machinery Co., Troy, N. Y.; United States Manganese Corporation, Trout Mining Co., and Hallowell-Skelton Electric Co., New York. General expansion will be carried out. Another subsidiary will be formed under Manhattan Electrical Supply Co., Inc., to take over and operate such branch of company business. Richard H. Brown is president.

Brewer Drydock Co., Richmond Terrace and Harbor Road, Mariners Harbor, S. I., is planning to rebuild part of ship repair plant destroyed by fire March 1.

Board of Commissioners, Sanitary District No. 1, Inwood, N. Y., is planning construction of automobile service, repair and garage building at new incinerator plant on Mott Avenue, entire project to cost over \$300,000. C. Marshall, Fulton Street, Hempstead, L. I., is engineer.

General Cable Corporation, 420 Lexington Avenue, New York, has secured permission from City Commission, Perth Amboy, N. J., to use part of DeKalb Avenue, from Mechanic to High Street, for addition to local plant of Standard Underground Cable Co., for use as rubber-covered wire producing unit, to cost over \$100,000 with equipment.

Eberhard Faber Rubber Co., 62 Hoyt Street, Newark, manufacturer of hard rubber goods, has awarded general contract to Enstice Brothers, Inc., 111 Academy Street, for four-story addition, 50 x 112 ft., to cost over \$100,000 with equipment.

Standard Motor Construction Co., 172 Whiton Street, Jersey City, N. J., manufacturer of Diesel engines, has arranged for an increase in capital for expansion.

Theurer Wagon Works, Inc., Tenth Avenue and Fifty-sixth Street, New York, has awarded general contract to J. A. Sarubbi, 415 Twentieth Street, West New York, N. J., for extensions and improvements in four-story factory at North Bergen, N. J., recently acquired, to cost about \$50,000. Company will establish new plant for manufacture of custom motor truck and automobile bodies and will remove to that location.

National Harris Wire Co., Verona and Prospect Avenues, Newark, has acquired Standard Alloy Wire Co., Elizabeth, N. J., manufacturer of kindred wire products, and will consolidate. It is understood that acquired plant will be removed to Newark works, where capacity will be increased. J. Frank Kavanaugh, head of Standard company, will become an official of purchasing organization.

Martin & Brown, Matawan, N. J., contractors, have purchased property, 80 x 500 ft., fronting on New York & Long Branch Railroad, for a new sand and gravel storage and distributing plant, including bins, loading equipment, etc. Company also plans to use part of land for service, repair and garage building.

Gottfried Krueger Brewing Co., 75 Belmont Avenue, Newark, has purchased one-story building at 249-63 Johnson Avenue, totaling over 16,000 sq. ft. floor space, and will equip for soft drink manufacturing unit, including installation of bottling machinery, conveying and other mechanical equipment.

Alloys Foundry Corporation, West Patterson, N. J., has been organized to manufacture special and standard castings for aircraft. C. P. Brown is president; Harold J. Ness, vice-president, and Harry G. Lamker, secretary and treasurer. Mr. Lamker was formerly superintendent of Wright Aeronautical Corporation.

## New England

BOSTON, March 10.—Dealers report machine tool business virtually at a standstill with no indication of users covering on old inquiries in the immediate future. There has also been a falling off in new inquiries. New England

machine tool builders generally are either largely engaged in filling orders from stock or rapidly exhausting backlog of tools formerly having greatly extended dates. Deliveries on certain types of tools were made the past week which, at the time the order was taken, had an April 1 or May 1 dating.

Norton Co., Worcester, Mass., in a letter to the Boston News Bureau says:

"The opening months of 1930 have shown business to be considerably improved over conditions prevailing in the final months of 1929. We believe this improvement is well-founded, and that continued expansion is in progress in the months ahead. The turning point in the recession during the last half of 1929 was passed in December. It is improbable that the volume of business in the spring months of 1930 will equal that of the corresponding period of 1929. The amount in 1930, however, should compare favorably with that in any of the years prior to 1929. We are operating at approximately 65 per cent of capacity, and are carrying a normal stock of goods. Competition in 1930 is likely to be intense."

Superior Spring & Mfg. Co., Hartford, Conn., has rejected bids for a new plant and will revise plans shortly.

Levi C. Wade, Lynn, Mass., is completing a machine shop and garage and has tentative plans for machine tools.

City of Westfield, Mass., has plans for a three-story trade school addition, 75 x 180 ft., to cost \$85,000 without equipment.

Acorn Bearing Co., New Britain, Conn., has purchased property on Stanley Street for extensions.

City of Meriden, Conn., about April 1 will award contract for a trade school, to cost \$175,000 with equipment.

Cambridge Electric Light Co., Cambridge, Mass., has filed plans for extensions and improvements to cost about \$200,000.

Bristol Co., Waterbury, Conn., manufacturer of recording instruments, has plans for new factory at Platts Mills, Conn., to cost about \$60,000 with equipment. F. A. Webster, 51 West Main Street, Waterbury, is architect.

Indian Motorcycle Co., Springfield, Mass., is arranging for increase in capital, part of proceeds to be used for expansion. Company is planning increased output of motor cycles, and will also give over part of plant to production of outboard motors for motorboats, a new line of manufacture. Company has been given exclusive rights to manufacture in United States all developments of Sunbeam Motor Car Co. of Great Britain, including new types of Diesel engines.

International Silver Co., State Street, Meriden, Conn., has awarded a general contract to Bartlett-Brainerd Co., 252 Asylum Street, Hartford, Conn., for one-story power house to cost about \$45,000 with equipment.

Presbrey Refractories Corporation, Taunton, Mass., has been formed with a capital of \$50,000 to take over and expand Presbrey Stove Lining Co., with local plant for manufacture of refractories. Wilbur E. Forbes is president and treasurer of new organization.

New England Power Association, Worcester, Mass., has authorized construction of a second power dam at McIndoe Falls, Vt., in connection with power development at Fifteen-Mile Falls, and will install a power plant at new dam to develop 9000-kw. capacity. A third dam will be constructed later. Entire project will cost about \$14,000,000, including steel tower transmission lines.

## The Crane Market

INQUIRY for locomotive cranes continues rather limited with most of the prospective orders in the industrial field, rather than from railroads or contractors. There is one sizable inquiry in the market from a railroad, but the cranes specified are special and the number of bidders is reported to be only three. This is a list of 15 to 30 special crawl-tread cranes of 8 tons capacity, inquired for by the Pennsylvania Railroad.

Overhead crane inquiry is still small with most buyers interested only in single cranes. The Connecticut River Development, 50 Congress Street, Boston, has purchased a 25-ton, 28-ft. span, 4-motor crane for McIndoe Falls, Vt., in addition to two gantry cranes awarded recently.

Granville Brothers Aircraft Corporation, 1211 Liberty Street, Springfield, Mass., is considering construction of one-story plant at Fisk airport, including parts and assembling units to cost over \$50,000 with equipment.

Scott & Williams, Inc., Laconia, N. H., manufacturer of knitting machines and parts, is planning four-story addition early in spring, to cost over \$85,000 with equipment. Company recently acquired Standard-Trump Brothers Machine Co., Wilmington, Del., manufacturer of kindred equipment, and plans manufacture of certain parts for such machines at Laconia plant, to be shipped to Wilmington for assembling, latter plant to be continued.

## Philadelphia

PHILADELPHIA, March 10.—Sun Oil Co., 1608 Walnut Street, Philadelphia, is planning new storage and distributing plant at Cleveland, to cost over \$250,000 with equipment. Company is also arranging for construction of pipe line from its refinery at Marcus Hook, Pa., to Pittsburgh and vicinity, later to be extended to Cleveland, to cost about \$5,000,000. An expansion and improvement program is in progress at Marcus Hook plant.

Rubel Coal & Ice Corporation, 937 Fulton Street, Brooklyn, has awarded general contract to William Steele & Sons Co., Fifteenth and Cherry Streets, Philadelphia, for one-story ice-manufacturing plant at Philadelphia, 66 x 185 ft., to cost about \$100,000 with machinery.

Interstate Air Transportation, Inc., 2435 North Broad Street, Philadelphia, has leased factory at Twentieth Street and Allegheny Avenue, totaling 14,000 sq. ft. floor space, for an aircraft plant.

Union Dental Instrument Mfg. Corporation, 831 Cherry Street, Philadelphia, has leased space in building at Pierce Street and Moyamensing Avenue, totaling about 13,000 sq. ft. floor space, for expansion.

Keystone Aircraft Corporation, Bristol, Pa., a unit of Curtiss-Wright Aircraft Corporation, 27 West Fifty-seventh Street, New York, is arranging for increased production at local plant, and will add about 400 operatives to working force during next 60 days. Plant area has recently been increased to 400,000 sq. ft., compared with about half that amount a little more than a year ago.

John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire rope, cables,

etc., will soon begin superstructure for one-story addition, totaling about 120,000 sq. ft. space, to cost over \$200,000 with equipment. General contract was let recently to John W. Ferguson Co., 152 Market Street, Paterson, N. J.

Captain Anton Helmen, 11 Seward Avenue, Toms River, N. J., aircraft and dirigible builder, has leased 39 acres of meadow land from City Commission, Atlantic City, N. J., and will use portion of site for new plant to manufacture multi-passenger high-powered aircraft, averaging from 80 to 95 ft. long, including parts and assembling departments. Part of tract will also be used for an airport, with hangars, repair shops, and other units.

Board of Education, State House, Trenton, N. J., has awarded general contract to John M. Yardley Construction Co., 1700 Walnut Street, Philadelphia, for two-story and basement trade school, 120 x 175 ft., for colored youths, at Bordentown, N. J., to cost about \$200,000 with equipment. Gilbert & Betelle, 20 Branford Place, Newark, N. J., are architects.

F. S. Pearson, Hurffville, near Sewell, N. J., manufacturer of automobile and wagon bodies, plans rebuilding part of plant destroyed by fire, March 3.

Following recent acquisition of Monitor Bi-Loop Radiator Co., Lancaster, Pa., by Lancaster Iron Works, Inc., same city, purchasing company has begun production of equipment of Monitor type at its local plant, including U-tube boiler units, and plans expansion in output in this line.

## South Atlantic

BALTIMORE, March 10.—Rustless Iron Corporation of America, Inc., Loney's Lane, Baltimore, has authorized an expansion and improvement program at local plant to more than triple present capacity, including new buildings and equipment, to cost over \$750,000. Company is a subsidiary of International Rustless Iron Corporation, 122 East Forty-second Street, New York. C. E. Tuttle is president.

Pennsylvania Water & Power Co., Lexington Building, Baltimore, with hydroelectric and steam-operated electric power plants at Holtwood, Pa., has arranged for bond issue of \$1,750,000, part of fund to be used for extensions and improvements. In cooperation with Consolidated Gas, Electric Light & Power Co., same address, company has recently organized Safe Harbor Water Power Corporation, to construct and operate a hydroelectric generating plant at Safe Harbor on Susquehanna River, about 8 miles from Holtwood, to cost about \$30,000,000 with steel tower transmission line. Consolidated Gas company is planning increase in capital from 1,200,000 to 2,000,000 shares of stock, no par value, part of fund to be used for expansion and betterments.

Norfolk & Western Railway Co., Roanoke, Va., is planning construction of one-story mechanical and blacksmith shop at local repair plant, 100 x 785 ft., to cost about \$200,000 with equipment. Installation will include one 20-ton, and two 10-ton traveling cranes, and other machinery for heavy work. W. P. Wiltsee is chief engineer.

Greenville Textile Supply Co., Greenville, S. C., textile mill equipment and supplies, has acquired Spartanburg Mill Supply Co., Spartanburg, S. C., distributor of similar equipment, and will consolidate. Spartanburg plant will be removed to Greenville, where increased

operations will be arranged. Consolidated company is affiliated with Atlanta Textile Supply Co., Atlanta, Ga.

Southern Mineral Products Corporation, operated by Vanadium Corporation of America, Inc., 120 Broadway, New York, has engaged Stone & Webster Engineering Corporation, Boston, to prepare plans for new mining and milling plant in Amherst and Nelson Counties, Va., with by-products unit for production of chemical products. Entire project will represent investment of more than \$1,000,000. Work will begin early in spring.

Virginia Public Service Co., Charlottesville, Va., has plans for a new steam-operated electric generating plant at Bremo, Va., on James River, to cost over \$1,200,000, including transmission line to connect with main system at Charlottesville. Electric Management & Engineering Corporation, 84 William Street, New York, is engineer. Equipment purchases will be made from last noted office.

Plans are under way for a reorganization of Bedford Tire & Rubber Co., Bedford, Va., and development of fund of \$250,000, to be used in part for improvements at local mill and for operating capital. Plant has been closed for several weeks and it is proposed to resume production soon.

Grinnell Co., Inc., Providence, R. I., manufacturer of fire extinguishers, fire sprinkler systems, etc., has asked bids on general contract for branch plant at Charlotte, N. C., for assembling, pipe-cutting and threading, and other mechanical work, to cost over \$125,000 with equipment. J. E. Surrine & Co., Greenville, S. C., is engineer.

Virginia Iron, Coal & Coke Co., St. Charles, Va., is planning construction of a new steel tipple at mining properties at Monarch Camp, about two miles from city, to cost about \$75,000 with machinery.

## Pittsburgh

PITTSBURGH, March 10.—Local dealers note a slight lull in buying since the first of the month, most marked by those who did a fairly good business in January and February. Many industrial plants are holding up inquiries and some purchasing departments report considerable difficulty in getting appropriations for additional buying. The Westinghouse Electric & Mfg. Co., East Pittsburgh, has changed its machine tool buying policy this year and is not issuing quarterly lists. Instead, buying is limited to a fixed sum each month and, following rather heavy purchases in January, it is not likely that further buying of importance will develop from this source until May or June.

Inquiry from the railroads is still confined to the Pennsylvania's activities. Most of the tools required are for Wilmington, Del., and the Altoona shops are doing little buying as yet. Industrial inquiry is made up principally of single tools and has been rather light in the past two weeks.

Purchases of heavy machinery and equipment by steel mills are still formidable. American Steel & Wire Co., Cleveland, is reported to have placed a new billet mill and other equipment for its Donora, Pa., steel works with a Youngstown maker. United Engineering & Foundry Co., Pittsburgh, has taken a combination rail and structural mill for

Weirton Steel Co., Weirton, W. Va., involving an expenditure of \$3,500,000.

Viking Metal Products Co., Ridgway, Pa., care of August Beckstrom, Ridgway, recently organized with paid-in capital of \$250,000, is planning early construction of new plant, initial unit to cost over \$75,000 with equipment. R. A. Cartwright, Ridgway, is president; Ernest Johnson, Jamestown, N. Y., vice-president; and Mr. Beckstrom, secretary and treasurer.

New Castle Stone Co., 320 Glass Street, New Castle, Pa., is considering erection of one-story stone-crushing and distributing plant at New Castle Junction, to cost over \$40,000 with equipment.

Dravo Contracting Co., Neville Island, Pittsburgh, operating a boat and barge-building and repair plant, has begun excavations for new marine railroad system, to cost over \$65,000 with equipment.

Board of Commissioners, Shaler Township, Pa., care of F. G. Ross, 309 Fourth Avenue, Pittsburgh, engineer, will receive bids until March 26, for centrifugal pumping machinery, 400,000-gal. steel tank, and other equipment for a water system.

Board of Education, McKeesport, Pa., is considering construction of new multi-story industrial school, to cost over \$400,000 with equipment. Dr. J. B. Richey, Ariel Building, is superintendent, in charge.

West Virginia Construction Co., Kellogg, W. Va., is planning one-story machine and repair shop, to cost about \$30,000 with equipment.

Loudon District Board of Education, Charleston, W. Va., plans installation of manual training department in new high school at South Charleston, to cost \$225,000. Walter Martens, Masonic Building, is architect.

Point Spring Co., Pittsburgh, has been formed to take over and expand company of same name, with plant at 20 First Avenue, to manufacture steel springs and other steel and iron products. Incorporators of new company include Thomas E. Shaw and E. C. McHugh, Union Trust Building; last noted is treasurer.

Fairmount Mfg. Co., Fairmount, W. Va., has changed its name to Fairmount Aluminum Co.

## Buffalo

BUFFALO, March 10.—Seneca Iron & Steel Co., Lake Avenue, Blasdell, Buffalo, has acquired 6-acre tract adjoining plant for expansion.

Rochester Button Co., 300 State Street, Rochester, N. Y., has removed part of plant from 49 Dickerson Street, Newark, N. J., to local factory, where capacity will be increased. Remainder of machinery from Newark works will be removed to a factory at Akron, Ohio. Production at Newark will be discontinued.

Crystal Ice & Storage Co., 636 Spring Street, Buffalo, has asked bids on general contract for one-story plant, to cost about \$70,000 with machinery. A. C. Bishop, 2199 Ashland Road, Cleveland, is architect and engineer.

Municipal Incinerator Co., Buffalo, has been organized by B. S. S. Linetty, 236 Lovejoy Street, and John R. Weaver, 742 Crescent Avenue, and plans establishment of factory to manufacture refuse disposal burners and equipment.

M. J. DeAngelis, 49 East Avenue, Rochester, N. Y., architect, has awarded general contract to Dawson Brothers, Union Building, Syracuse, N. Y., for one-

story automobile service, repair and garage building at Syracuse, to cost about \$100,000 with equipment.

Universal Wireless Communication Co., Inc., Liberty Bank Building, Buffalo, is planning establishment of 100 or more broadcasting and receiving stations in different parts of the country for commercial communications, including steel towers, antenna lines, power stations, etc. G. Morton Wolfe, 1377 Main Street, is architect and engineer.

## Milwaukee

MILWAUKEE, March 10.—While improvement in the machine-tool industry is gradual and within narrow limits, sentiment is more cheerful, due to the greater number of inquiries. As a rule, shops are more interested in looking after necessary replacements than in the acquisition of equipment for expanding capacity, existing facilities being sufficient to handle present production. Industrial construction is still restricted.

Massey-Harris Co., Racine, Wis., maker of farm machinery, tractors, etc., has increased production schedule of tractor department 50 per cent, and output is now in advance of a year ago.

Hexcel Radiator Co., 57 Erie Street, Milwaukee, has received contract for all radiator requirements of American Austin Car Co., Detroit, and in addition to taking more space in present building, will install new equipment costing about \$25,000. This is third plant enlargement within a year and increases total area to 100 per cent above a year ago. F. M. Opitz is president and general manager.

Chicago, Milwaukee, St. Paul & Pacific Railway has placed contract with Lupinski, Inc., First Street and Capitol Drive, Milwaukee, for one-story addition, 70 x 100 ft., and improvements in forge and blacksmith shop at West Milwaukee locomotive and car shops. Work will cost about \$50,000. C. F. Loweth is chief engineer.

Fuller & Johnson Co., 1342 East Washington Avenue, Madison, Wis., manufacturer of gasoline engines, is improving plant and equipment at a cost of about \$30,000.

Board of Public Works, Oshkosh, Wis., is taking bids until March 14 for new filtration plant for municipal water system. Main structure will be 100 x 115 ft. Project is in charge of Pearse, Greeley & Hamilton, consulting engineers, Chicago. A. H. Schmidt is city clerk.

Division freight yards at Janesville, Wis., of Chicago, Milwaukee, St. Paul & Pacific Railway will undergo improvements and enlargement costing about \$200,000. Plans include new freight house with conveying and other handling equipment. C. F. Loweth, Chicago, is chief engineer.

Appleton Post-Crescent Publishing Co., Appleton, Wis., will build new newspaper and general printing plant to cost \$125,000. Work will start early next fall.

David White Co., 315 Court Street, Milwaukee, manufacturer of fine engineering instruments, surveying equipment and architects' supplies, has acquired business of Wissler Instrument Co., St. Louis, maker of similar equipment. Concentration of all production at Milwaukee is contemplated. David White is president and general manager.

Briggs & Stratton Corporation, Milwaukee, manufacturer of automobile switches and locks, portable gasoline en-

gines, etc., has purchased L. X. L. Metal Spring Cover Co., Milwaukee, maker of metal covers for automobile springs, and will transfer production to its own plant, making some additions to equipment.

## Chicago

CHICAGO, March 10.—Some machine tool dealers report new business less active as March advances, while others have booked a substantial volume the past week. Few orders mature from recent inquiries which are light but steady. It is not uncommon to find sales closed on bids which were submitted as far back as December and even November of last year.

Inquiries from farm implement manufacturers are only for occasional machine tools, and in the absence of industrial lists from other sources, dealers are focusing attention on the rather sparse needs of the railroads. Items to be placed by the Santa Fe still represent most of the list issued by that railroad. It is thought by some that the Milwaukee Road will begin to close for its machine tool needs by the middle of March. Requirements of the Burlington are still in the hands of the mechanical department.

Orders on books of Foote Brothers Gear & Machine Co., Chicago, from Jan. 1 to date exceed those of corresponding period in 1929 by 30 per cent, according to W. C. Davis, president. All plants of company are operating at capacity with sufficient orders on hand to insure production at full speed for next 90 days.

Phoenix Horse Shoe Co., North Broadway, Joliet, Ill., has awarded general contract to Hansen-Petersen Co., South Des Plaines Street, for a one-story addition, to cost about \$25,000 with equipment.

Electric Coal Mining Machinery Co., 309 St. John's Court, Chicago, will take bids at once for a two-story addition at Danville, Ill., to be used in part as a machine shop, to cost over \$65,000 with equipment. Lewis & Daugherty, Adams Building, Danville, are architects.

Hammond Clock Co., 4115 East Ravenswood Avenue, Chicago, manufacturer of electric clocks, has purchased four-story and basement factory with adjoining land at 2911 North Western Avenue, totaling about 80,000 sq. ft. floor space, for a new plant.

City Council, Fairmont, Minn., will issue bonds for \$40,000 for extensions and improvements in municipal electric light and power plant, including additional equipment. Charles Foster, Sellwood Building, Duluth, Minn., is engineer.

Ovens, power equipment, conveying and other machinery will be installed in three-story and basement plant to be erected by Pfaff Baking Co., Mason City, Iowa, to cost about \$250,000.

Chicago, Burlington & Quincy Railroad Co., 517 West Jackson Boulevard, Chicago, has plans for a new steam-operated power plant at Omaha, Neb., to cost about \$75,000 with equipment. Company engineering department is in charge.

Charles A. Olson & Co., 2945 Pillsbury Avenue, Minneapolis, Minn., manufacturer of commercial automobile bodies, is considering construction of one and two-story and basement addition, to cost about \$40,000 with equipment. C. J. Bard, Builders' Exchange, is architect.

Walker Vehicle Co., 8700 South State

Street, Chicago, manufacturer of electric trucks, etc., has awarded general contract to E. W. Sproul & Co., 2001 West Pershing Road, for one-story addition, 300 x 390 ft., to cost about \$250,000 with equipment.

City Council, Mount Pleasant, Iowa, has plans for extensions and improvements in municipal electric light and power plant, to cost about \$35,000 with equipment. W. F. Weibley, Tama Building, Burlington, Iowa, is architect.

American Beet Sugar Co., Steel Building, Denver, is considering new beet sugar mill near Winnipeg, Man., to cost about \$250,000 with machinery.

## Cincinnati

CINCINNATI, March 11.—New bookings by machine tool builders increased slightly the past week. While demand is still far from normal, the continued briskness of inquiry combined with this increase in orders tends to give a firmer undertone to the market. In fact, if only a part of the inquiries are placed, manufacturers should be able to maintain operations at a high rate.

A local builder has sold four special lathes to an automobile manufacturer. Another automobile maker is in the market for new equipment and the Amtorg Trading Corporation, New York, is inquiring for about 30 tools.

Aluminum Industries, Inc., 2438 Beekman Street, Cincinnati, has awarded general contract to Fisher-DeVore Co., Dana Street, for two one-story additions, to cost about \$100,000 with equipment.

Machine Mfg. & Supply Co., 2432 Park-way Place, Memphis, Tenn., recently organized by E. R. McKenzie and associates, to manufacture oil devices and equipment, has leased a building at 278-80 Poplar Avenue for establishment of a plant.

Rotary Stove Mfg. Co., Memphis, Tenn., care of F. C. Spellings, 1085 Poplar Avenue, is planning early establishment of local plant to manufacture a patented stove, invented by Mr. Spellings, initial unit to cost about \$30,000 with equipment.

Bevis Machine Co., Middletown, Ohio, is contemplating one-story metal-working and machine shop addition, to cost over \$35,000 with equipment.

State Department of Public Welfare, Columbus, Ohio, is arranging early call for bids on general contract for two-story vocational training school, with two wings, each 36 x 120 ft., at Ohio Soldiers' and Sailors' Orphans Home, Xenia, Ohio, to cost about \$100,000 exclusive of equipment. Robert S. Harsh & Associates, Inc., East Broad Street, Columbus, are architects.

De Soto Paint & Varnish Co., Memphis, Tenn., is planning expansion improvements, including installation of additional equipment, to cost over \$100,000. Company is operated by Sears, Roebuck & Co., Chicago.

Kentucky-Tennessee Light & Power Co., Bowling Green, Ky., is planning for new steam-operated electric generating station on Barren River, near city, initial unit to cost over \$1,000,000, including transmission line. W. S. Barstow & Co., 50 Pine Street, New York, are engineers.

Smith Motor Coach Co., Paducah, Ky., is planning construction of new bus terminal, including shop for motor repairs and parts production, and bus body rebuilding department.

## Gulf States

BIRMINGHAM, March 10.—Jaffee Iron & Metal Co., North Twenty-eighth Street, Birmingham, has awarded general contract to Inglenook Construction Co., 4011 First Avenue, for rebuilding part of storage and distributing plant, recently destroyed by fire, to cost \$30,000.

Corsicana Grader & Machine Co., Corsicana, Tex., is considering a one-story addition on adjoining site, to cost about \$25,000.

San Antonio Casket Co., San Antonio, Tex., has begun construction of new factory unit, to cost over \$65,000 with equipment.

Gulf States Utilities Co., Beaumont, Tex., is planning expansion and improvements in power plants and transmission lines, to cost about \$1,700,000 with equipment.

Board of Directors, Alabama School of Trades, Gadsden, Ala., is considering construction of three one-story shop units, averaging 60 x 140 ft., to cost about \$60,000. Watt T. Brown is chairman.

Swift & Co., Union Stock Yards, Chicago, has work under way on a three-story packing plant at Taylor, Tex., to include installation of conveying equipment, refrigerating machinery, etc., to cost over \$140,000.

Texas Potash Corporation, Midland, Tex., with headquarters at 2424 South Boulevard, Dallas, Tex., is planning development of potash properties at first-named place, including installation of mining machinery, conveying and mechanical-loading equipment. A refinery is also proposed, entire project to cost about \$1,000,000 with machinery.

Cosden Co., Big Spring, Tex., is considering extensions in local oil refinery to double capacity from 10,000 to 20,000 bbl. daily, to cost over \$200,000 with machinery. Company is a subsidiary of Mid-Continental Petroleum Corporation, with headquarters at Tulsa, Okla.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has plans for a new factory branch and distributing plant at Corpus Christi, Tex., to cost more than \$50,000 with equipment. Dielmann & Levy, State National Bank Building, Corpus Christi, are architects.

Houston Lighting & Power Co., Electric Building, Houston, Tex., has work under way on extensions and improvements in Deepwater steam-operated electric power plant, to include installation of two new generating units, boiler units, pumping equipment and accessories. Plant will develop output of about 150,000 kw., and is scheduled for completion in 12 to 14 months. Work will cost more than \$5,000,000 including transmission lines. Later company will make further extensions in plant for ultimate capacity of 300,000 kw.

General Mills, Inc., Minneapolis, Minn., has plans for new terminal grain elevator at Wichita Falls, Tex., adjoining present unit at that place, to cost over \$450,000 with elevating, conveying, screening and other mechanical equipment.

Hollingsworth Motor Co., Harlingen, Tex., has awarded general contract to J. M. Meeks, Harlingen, for a two-story service, repair and garage building, to cost about \$100,000 with equipment. R. Newell Waters, Harlingen, is architect.

City Council, San Antonio, Tex., is considering extensions and improvements in municipal airport at Winburn Field, including new hangar units, with repair facilities, and other field structures, to cost \$250,000.

## Cleveland

CLEVELAND, March 10.—Machine tool sales showed no gain during the past week. Business continues at about the same volume as in February and there are not many indications of an improvement this month, although some dealers report a slight gain in inquiry for single tools. These inquiries are coming from diversified sources, including automobile tire manufacturers, steel makers for maintenance departments and contractors. Scattered orders are coming from production shops for replacement. While a little inquiry is coming from makers of automobile parts, the automotive industry continues very quiet.

Chain Products Co., Cooper Avenue, S. E., Cleveland, will enlarge its plant by erection of a two-story brick and steel addition, 100 x 300 ft.

General Electric Co., Schenectady, N. Y., has awarded general contract to Sam W. Emerson Co., 1836 Euclid Avenue, Cleveland, for one-story building, 100 x 175 ft., at local plant, Nela Park, to cost \$150,000 with equipment.

National Milling Co., Toledo, Ohio, is planning addition to flour mill, including new elevators, to cost \$600,000 with screening, conveying, elevating and other equipment. Company is a subsidiary of National Biscuit Co., 85 Ninth Avenue, New York.

East Ohio Gas Co., 1405 East Sixth Street, Cleveland, has plans for one-story mechanical shop at Dennison, Ohio, to cost about \$30,000 with equipment. C. J. Marr, 151 Broadway, New Philadelphia, Ohio, is architect.

Osborn Mfg. Co., 5401 Hamilton Avenue, Cleveland, manufacturer of foundry brushes and equipment, has plans for a one-story machine shop, to cost about \$45,000 with equipment. Austin Co., is architect and engineer.

Officials of East Ohio Sewer Pipe Co., Irondale, Ohio, and several similar organizations, including Great Northern Sewer Pipe Co., Empire, Ohio, are organizing Ceramic & Steel Products Co., with capital of \$30,000,000, to take over and consolidate a group of plants in eastern Ohio and western Pennsylvania specializing in production of vitrified sewer pipe, underground conduits for electric service and similar products. It is proposed to erect a plant near Ulrichsville, Ohio, to cost over \$150,000, and about \$1,000,000 will be expended for improvements and extensions of existing plants, including machinery.

## St. Louis

ST. LOUIS, March 10.—Broderick & Bascom Rope Co., 4203 North Union Boulevard, St. Louis, manufacturer of wire rope, cable, etc., has plans for one-story branch plant, 60 x 228 ft., at Seattle, to cost about \$70,000 with equipment. Larkin Engineering Co., 406 Market Street, St. Louis, is engineer.

Magnet Ignition Co., 304 East Second Street, Tulsa, Okla., has plans for one-story repair and equipment shop, 75 x 100 ft., for automobile and other gas engine work.

Oklahoma Cement Pipe Co., Tulsa, Okla., is planning construction of new plant on 7-acre tract in Crowell Heights district, including installation of bins for raw material supply and distribution, conveying machinery and other mechanical

handling equipment, with one-story storage and distributing unit, 60 x 200 ft., entire project to cost over \$70,000 with equipment. J. M. Chandler is president.

Central Power Co., Grand Island, Neb., is considering extensions and improvements in local steam-operated electric power plant, including installation of additional equipment, to cost over \$80,000.

Blue Valley Machine & Die Works, Inc., 7014 East Fifteenth Street, Kansas City, Mo., has awarded general contract to M. R. Stein, 2319 East Sixtieth Street, for one-story machine shop, 48 x 85 ft.

Whitney Harb, 1868 Summit Street, Little Rock, Ark., local representative for Ford automobile, has plans for a new service, repair and sales building, 120 x 245 ft., at North Little Rock, to cost about \$100,000 with equipment. Thompson, Sanders & Ginocchi, Hall Building, are architects.

City Council, Hannibal, Mo., is considering establishment of municipal airport, including hangars, repair shop, oil storage and other field units, to cost about \$140,000. City engineer will be in charge.

International Harvester Co., 606 South Michigan Avenue, Chicago, has plans for two-story factory branch and distributing plant at Grand Island, Neb., to cost about \$140,000 with equipment.

City Council, Stillwell, Okla., is planning extensions and improvements in municipal electric light and power plant, including installation of a Diesel oil engine and other equipment.

## Detroit

DETROIT, March 10.—Bohn Aluminum & Brass Corporation, 2512 East Grand Boulevard, Detroit, has plans for a new factory group of one and multi-story units, to cost about \$1,000,000 with equipment. Bids for initial structure will be asked within 30 days. Christian W. Brandt, Francis Palms Building, is architect.

Michigan Public Service Co., Ludington, Mich., plans extensions and improvements at hydroelectric generating plant at Leland, including installation of additional equipment, to cost about \$50,000.

Detroit Stoker Co., 1510 East First Street, Monroe, Mich., is considering a one-story addition to cost about \$55,000 with equipment.

Briggs & Stratton Corporation, General Motors Building, Detroit, manufacturer of automobile locks and hardware, small gasoline engines, etc., has acquired a controlling interest in I.X.L. Metal Spring Cover Co., Milwaukee, manufacturer of spring covers for automobiles, and will consolidate. Acquired company will be operated as a subsidiary.

W. A. Case & Son Mfg. Co., 203 West Woodbridge Avenue, Detroit, manufacturer of plumbing equipment and supplies, has awarded a general contract to Austin Co. for one-story addition for storage and distribution, to cost \$40,000 with equipment.

Antrim Iron Co., Mancelona, is planning expansion to cost over \$80,000; a new power house will be built to cost about \$25,000 with equipment. B. Parks & Son, Michigan Trust Building, Grand Rapids, are engineers.

Stinson Aircraft Corporation, Wayne, Detroit, is planning establishment of new factory branch and distributing plant at Los Angeles, including parts department, to cost about \$40,000.

Hill Diesel Engine Co., Lansing, manu-

facturer of oil-burning Diesel engines, is planning expansion, including installation of additional equipment, to cost over \$75,000.

Michigan National Guard, Detroit, will soon begin construction of a new hangar, with repair facilities at Wayne County Airport, to cost about \$280,000 with equipment. Giffels & Vallet, Marquette Building, are engineers.

National Acme Co., Cleveland, announces appointment of Charles A. Strelinger Co., 149 East Larned Street, Detroit, to handle sales and service of Namco opening threading dies, collapsing taps, other production threading tools using Namco chasers, Namco chaser grinding fixtures and chasers and parts for above tools. A complete stock will be carried.

## Indiana

INDIANAPOLIS, March 10.—Independent Concrete Pipe Co., 201 North West Street, Indianapolis, manufacturer of reinforced concrete pipe, is planning extensions and improvements in former plant of Indianapolis Concrete Products Co., 2050 South Harding Street, recently acquired, including one-story addition and installation of pipe-making machine, mechanical-handling and other equipment, to cost about \$50,000.

Board of Trustees, Indiana Soldiers' and Sailors' Orphans Home, Knightstown, has awarded general contract to Milo Cutshall, Akron, Ind., for one-story and basement power plant, 75 x 100 ft., to cost about \$100,000 with equipment. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects; John M. Rott Engineering Co., Merchants' Bank Building, Indianapolis, is engineer in charge of purchases.

Oliver Farm Equipment Co., South Bend, has leased two-story building to be erected at South Dallas, Tex., totaling 60,000 sq. ft. floor space, for factory branch and distributing plant, to cost about \$150,000 with equipment. E. C. Martin, Dallas, is architect.

Well Packing Co., Hancock Avenue, Evansville, will take bids on general contract for a cold storage and refrigerating plant, to cost about \$30,000 with equipment. P. H. Henschien, 1637 Prairie Avenue, Chicago, is architect.

Department of Aviation, Fort Wayne, has plans for two-story hangar unit, 110 x 140 ft., at municipal airport, Paul Baer Field, with repair and reconditioning facilities, to cost \$46,000. Everett I. Brown, First National Bank Building, is architect.

## Pacific Coast

SAN FRANCISCO, March 6.—Welded Shipbuilders, Ltd., Wilmington, Los Angeles, a subsidiary of Los Angeles Mfg. Co., 2500 Lenard Street, manufacturer of steel well casing, steel tanks, stacks, etc., is planning new shipbuilding plant at Wilmington harbor, with equipment for semi and automatic steel welding, to cost over \$150,000 complete.

Gillespie Furniture Co., Los Angeles, has plans for one-story factory, 140 x 450 ft., to cost about \$150,000 with equipment. Austin Co. of California, Inc., is architect and engineer.

Pacific Coast Pulp & Paper Co., Richvale, Cal., has begun construction of new local mill to manufacture pulp and paper from grapevine waste, to cost \$250,000 with machinery. General contract has

been let to Charles S. Mabrey Co., Inc., 1001 Forty-fifth Street, Sacramento, Cal. E. C. Swan, Portland, is engineer.

Willard Storage Battery Co. of California, Inc., Los Angeles, a subsidiary of Electric Storage Battery Co., Philadelphia, will issue \$650,000 in stock, part of fund to be used for general expansion.

Buffelin Wood Pipe Co., Tacoma, Wash., manufacturer of large diameter reinforced wood pipe sections, has acquired plant of American Wood Pipe Co., local, and will remodel for new work. Plant will be electrified, replacing former steam operation.

Dry Ice Corporation, Los Angeles, affiliated with Liquid Carbonic Co., 3100 South Kedzie Avenue, Chicago, has plans for one-story ice-manufacturing plant, 110 x 147 ft., to cost about \$80,000 with machinery. Austin Co. of California, Inc., is architect and engineer. Parent company is planning new plant at Seattle, 150 x 180 ft., for which plans will be drawn by Austin Co., to manufacture carbonic gas, dry ice, etc., to cost \$200,000 with machinery.

Day & Night Water Heater Co., Monrovia, Cal., has plans for a one-story addition, totalling about 30,000 sq. ft. floor space, to cost about \$50,000 with equipment. Hamm, Grant & Bruner, Inc., Ferguson Building, Los Angeles, is architect and engineer.

Pioneer Paper Co., 5500 South Alameda Street, Los Angeles, has plans for a two and three-story addition, 50 x 100 ft., to cost about \$65,000 with equipment. Hamm, Grant & Bruner, Inc., Ferguson Building, is architect and engineer.

## Canada

TORONTO, March 10.—Machine tool business is confined mostly to replacement needs with orders chiefly in single units. Several companies planning additions have inquiries out, many of which will probably be closed within the next six weeks. A large amount of new business is beginning to appear from the mining fields.

Noranda Mines, Ltd., J. Y. Murdoch, president, Royal Bank Building, Toronto, has purchased 85 acres in Montreal East, and will start construction immediately on a \$2,000,000 copper refinery. Most of plant will be given over to smelting ore from Noranda mines and will be under the control of Canadian Copper Refineries, Ltd.

Alexander Murray Co., Ltd., 4035 Richelieu Street, Montreal, is contemplating building a \$1,000,000 plant for manufacture of celotex.

E. O. Weber, Ltd., 927 King Street, Preston, Ont., has awarded contract to George Reitzel, Waterloo, Ont., for a three-story machine shop, 60 x 120 ft.

Canadian Mead-Morrison Co., Ltd., Main Street South, Welland, Ont., has awarded contract to Gardner Construction Co., 22 Cross Street, for a two-story addition to machine shop.

British Columbia Refractories, Ltd., has leased 6-acre site at New Westminster, B. C., for erection of a plant to cost \$100,000. Construction work will start immediately.

## Foreign

PLANS are being considered by Imperial Chemical Industries, Ltd., London, England, for a new plant near Cape Town, South Africa, for production of

## The Week's News Quickly Told

Current Events That Bear on the Course of Business

TRADE still lags; many important commodities decline further in price, forcing index to a new low.

\* \* \* \* \*

WHEAT and cotton prices share in the decline, despite loans and purchases by Federal Farm Board. The latter announces that it "will buy and remove from the market whatever additional quantity may be necessary to prevent any considerable decline in wheat prices." It has also asked President Hoover and Congress for \$100,000,000 additional funds. Prices for the 1930 American wheat crop will probably be about the same as prevailing in 1929, according to the United States Department of Agriculture.

\* \* \* \* \*

AGRICULTURAL machinery, road machinery and implements are being manufactured at a notably high rate. Orders for tractors are especially large.

\* \* \* \* \*

MONEY is cheaper. Call rates in many European countries, and 90-day acceptances in America have been reduced approximately  $\frac{1}{2}$  per cent.

\* \* \* \* \*

RAILROAD income during 1930 will be within 3 per cent of 1929, according to an index hitherto proved reliable, said Secretary of Commerce Lamont. Loadings of revenue freight for the four weeks in February were only 7 per cent below 1929 and  $2\frac{1}{2}$  per cent below 1928.

\* \* \* \* \*

NAVAL expenditures by Great Britain during 1930 will be \$20,000,000 less than in 1929.

\* \* \* \* \*

UNEMPLOYMENT figured prominently in news from several American cities and foreign countries. Secretary of Labor Davis said that of the 46,000,000 of our citizens earning a living, at least 43,000,000 are working. The difference is due to seasonal conditions except in 12 States.

\* \* \* \* \*

OIL output has at last been curtailed by proration among California operators. Standard Oil (N. J.) has inaugurated a six-day refining schedule, without cutting per-

sonnel or wages, to bring production into line with consumption.

\* \* \* \* \*

NEWS despatches will be broadcast in code to newspapers, where special machines will decode them automatically, if permits for the erection of two radio stations with special wave lengths are granted by the Federal Radio Commission. Radio News Corporation, which applied for the permit, has tested the system extensively, and believes it will be more economical than transmission by telegraph.

\* \* \* \* \*

LABOR bank is to be founded by the government of Mexico, as part of a program to finance labor cooperatives, foster personal thrift among workers, furnish funds for the construction of industrial centers and aid the unemployed. Social insurance will also be encouraged.

\* \* \* \* \*

COAL miners in the Illinois district, by a concerted effort to overthrow the United Mine Workers of America, have precipitated a portentous struggle in American Federation of Labor ranks. Demoralization of the union organization in the mid-west coal district is regarded as a possible outcome of the revolt.

\* \* \* \* \*

AN all-welded steamship built in United States has been tested at Charleston, S. C. Structural details are patented. Savings of 20 per cent in weight and 25 per cent in cost are claimed. United States Shipping Board has loaned Caoma Steamship Corporation, New York, \$1,896,000 for the construction of a 4500-ton passenger and cargo ship.

\* \* \* \* \*

UNIFORM traffic regulations on highways throughout the country, as a measure to combat economic waste and business losses as well as deaths, resulting from vehicular accidents, will be urged by a convention of the National Conference of Street and Highway Safety. Secretary of Commerce Lamont has called the meeting for the last week in May. Representatives of trade associations, engineering bodies, insurance companies and municipal governments are invited to attend. Automobile accident deaths so far this year show a 10 per cent decrease.

ammonia, initial unit to cost over \$400,000 with equipment.

American & Foreign Power Co., Inc., operated by Electric Bond & Share Co., 2 Rector Street, New York, with electric light and power properties in several foreign countries, is disposing of a bond issue of \$50,000,000, a part of proceeds to be used for expansion and acquisition of additional properties.

In connection with new clock and watch manufacturing plant now being established by Soviet Russian Government, Moscow, near that city, contracts have been placed for a quantity of precision tools and machinery with Ansonia Clock Co., Ansonia, Conn., and Dueber-Hampden Watch Co., Canton, Ohio, totaling about

\$650,000. Recently organized Combined Steel Industry, "Stal," Moscow, has plans for increasing size and capacity of steel mill now in course of construction at Magnitogorsk, Ural. Plant was initially designed for handling 600,000 metric tons of pig iron; new buildings will be erected and equipment ordered for a capacity of 2,500,000 tons annually. Amtorg Trading Corporation, 261 Fifth Avenue, New York, is official buying agent for Soviet Union.

National Railways of Mexico, Mexico City, are planning for electrification of line from Mexico City to Cuernavaca. Plans and list of equipment to be purchased will be prepared by engineering department. Power will be secured from Mexican Light & Power Co.

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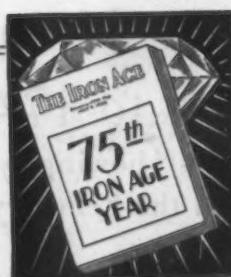
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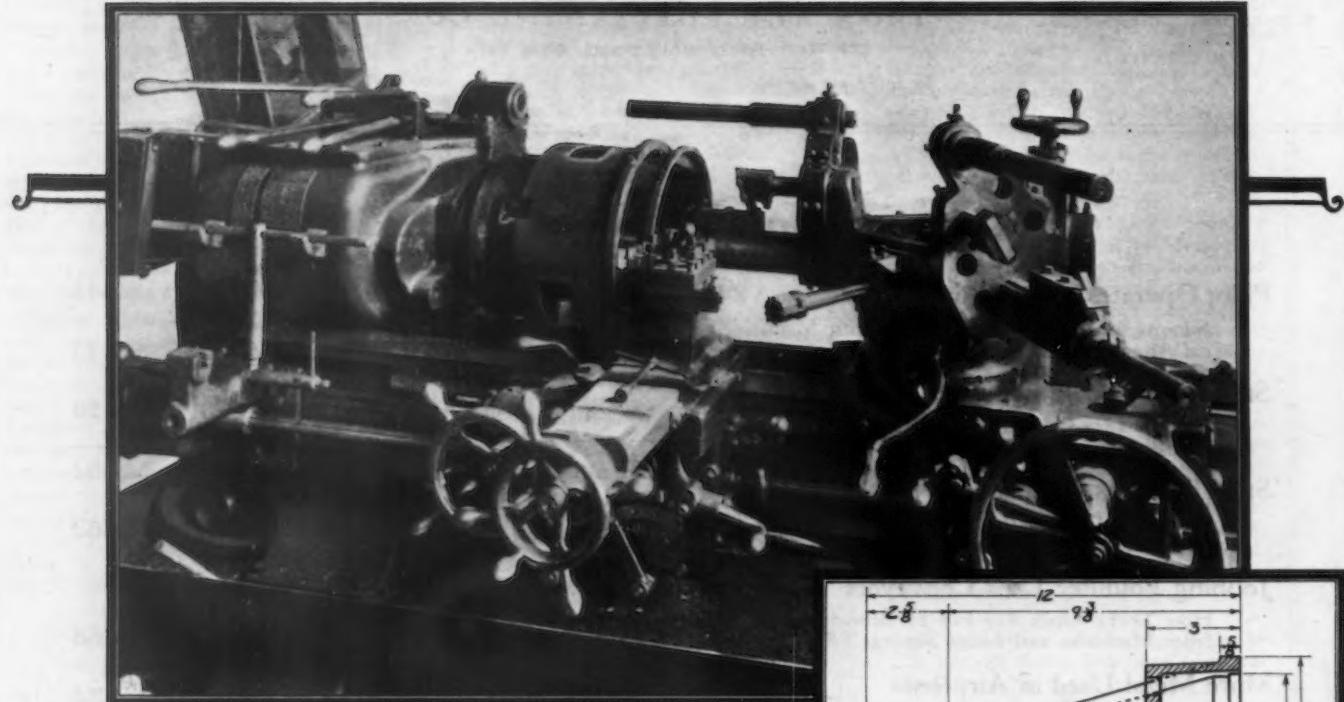
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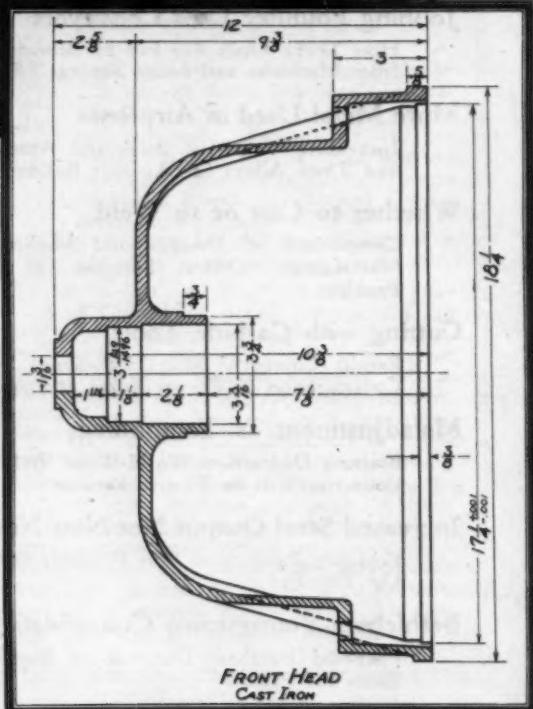
# It Pays to Replace Obsolete Turret Lathes with Modern W & S Machines



A prominent manufacturer of electric motors replaced two old type turret lathes with a new W & S 2-A machine, averaging a saving of 68% on several jobs previously done on the obsolete machines.

The new and more powerful W & S 2-A reduced the machining cost on this job--a Front Head--from 70¢ to 17¢ per piece.

This is the third of a series showing typical jobs in this customer's shop. The second appeared in the February 20th issue of this magazine.



## The Warner & Swasey Company

Cleveland, Ohio, U. S. A.